I Believe in me, not OCB: Evaluation of Group Function-Based CBT as a Treatment for Obsessive Compulsive Behaviour in Four Children with HFA

Nicole M. Neil

The Centre for Applied Disability Studies

Submitted in partial fulfillment

of the requirements for the degree of

Masters of Arts

Centre for Applied Disability Studies, Brock University

St.Catharines, Ontario

Abstract

Researchers have conceptualized repetitive behaviours in individuals with Autism Spectrum Disorder (ASD) on a continuum of lower-level, motoric, repetitive behaviours and higher-order, repetitive behaviours that include symptoms of OCD (Hollander, Wang, Braun, & Marsh, 2009). Although obsessional, ritualistic, and stereotyped behaviours are a core feature of ASD, individuals with ASD frequently experience obsessions and compulsions that meet *DSM-IV-TR* (American Psychiatric Association, 2000) criteria for Obsessive-Compulsive Disorder (OCD). Given the acknowledged difficulty in differentiating between OCD and Autism-related obsessive-compulsive phenomena, the present study uses the term Obsessive Compulsive Behaviour (OCB) to represent both phenomena. This study used a multiple baseline design across behaviours and ABC designs (Cooper, Heron, & Heward, 2007) to investigate if a 9-week Group Function-Based Cognitive Behavioural Therapy (CBT) decreased OCB in four children (ages 7 – 11 years) with High Functioning Autism (HFA). Key treatment components included traditional CBT components (awareness training, cognitive-behavioural skills training, exposure and response prevention) as well as function-based assessment and intervention. Time series data indicated significant decreases in OCBs. Standardized assessments showed decreases in symptom severity, and increases in quality of life for the participants and their families. Issues regarding symptom presentation, assessment, and treatment of a dually diagnosed child are discussed.

Acknowledgements

It is a pleasure to thank the many people who made this thesis possible. Foremost, I would like to thank my supervisor, Dr. Tricia Vause. You have been an amazing mentor throughout my graduate experience and without your expertise, patience, and understanding this thesis would not have been possible. I would also like to express my gratitude to the other members of my committee, Dr. Maurice Feldman, and Dr. Rosemary Condillac for the feedback and encouragement they provided throughout this research project. I would also like to thank Lisa Lam, Melissa Fleishman, and Julia Nemcko, whose contributions made this study possible. I am indebted to Heather Yates who sacrificed most of her social life to help me organize the data for this project and who provided many hours of company in our research lab. I am grateful to the parents and children who participated in this research project and their efforts in taking charge of OCB. I would also like to thank my mother, Mary Neil, and my boyfriend, Dimitry Belais, for the support they have provided me throughout my graduate experience.

This research would not have been possible without financial support from Brock University Graduate Studies, a Frederick Banting and Charles Best Canada Graduate Scholarship from the Canadian Institutes of Health Research, and a New Investigator Fellowship from the Ontario Mental Health Foundation and the Ministry for Long-Term Care.

Table of Contents

List of Tables

List of Figures

I Believe in me, not OCB: Evaluation of Group Function-Based CBT as a Treatment for Obsessive Compulsive Behaviour in Four Children with HFA

Introduction

Autism Spectrum Disorder (ASD) is an umbrella term representing three disorders including: Autistic Disorder, Asperger's Disorder, and Pervasive Developmental Disorder-Not Otherwise Specified (*DSM-IV-TR*, American Psychiatric Association [APA], 2000). The prevalence of ASDs among children in Canada is approximately 1 in 165 (Fombonne, Zakarian, Bennett, Meng, & McLean-Heywood, 2006) and has been estimated at 1 in 110 in the United States (Centers for Disease Control and Prevention, 2006). ASDs are neurological disorders characterized by impaired social interaction and communication, and restricted and/or repetitive behaviour (APA, 2000).

Diagnostic criteria for the repetitive and/or restrictive behaviour domain is organized into four subgroups: (a) stereotyped motor mannerisms, (b) pre-occupation with non-functional objects or parts of objects, (c) patterns of interest that are unusual in the narrowness and/or intensity of their pursuit; and (d) extreme rigidity and insistence on sameness (APA, 2000). Researchers have begun to conceptualize repetitive behaviours in individuals with ASD on a continuum with motoric repetitive behaviours (such as stereotyped movements and self-injury) anchoring the "lower-order" repetitive behaviours and more complex behaviours (such as object attachments, repetitive language, and circumscribed interests) anchoring the "higher-order" repetitive behaviours (Hollander, Wang, Braun, & Marsh, 2009). Further, research suggests that the higher-order repetitive behaviours include a number of compulsive behaviours (e.g., ordering, checking, washing, rituals involving another person) that are routinely observed in persons with Obsessive Compulsive Disorder (OCD) and these behaviours are associated with

higher cognitive functioning. While lower-order behaviours may be "coping" reactions used to modulate stress or arousal, the disruption of higher-order repetitive behaviours often results in anxiety or distress (Hollander et al., 2009; Milterni, Bravaccio, Falco, Fico, & Palermo, 2002).

Higher-Order Repetitive Behaviour: Differentiating Between Autism-related Obsessive-Compulsive Phenomena and Obsessive Compulsive Disorder

Researchers (e.g., Fischer-Terworth, & Probst, 2009) discuss that repetitive behaviours encompass two classes: (a) Autism-related obsessive-compulsive phenomena (AOCP), and (b) OCD behaviours. Autism-related obsessive-compulsive phenomena include excessive involvement in circumscribed special interests, engagement in compulsive rituals, stereotyped and repetitive motor mannerisms, and insistence on sameness. These behaviours that are a part of the clinical picture of ASD Although AOCP and OCD are similar, individuals with ASD may not experience distress associated with their rigid beliefs and may not perform their rituals to alleviate anxiety (Ruta, Mugno, D'Arrigo, Vitiello, & Mazzone, 2010). In fact, obsessional interests in individuals with ASD may not be associated with anxiety or guilt, but rather accompanied by feelings of euphoria (Fischer-Terworth & Probst, 2009). On the other hand, some rituals in ASD resemble symptoms of OCD; the interruption of rituals can cause significant distress in children with ASD and in individuals with OCD (Fischer-Terworth & Probst, 2009). Insistence on sameness behaviour (e.g., sitting in the same seat) strongly resembles typical OCD-related "just right" behaviours. In the absence of clear obsessions, which are often difficult for children with ASD to verbalize (Gillott, Furniss, & Walter, 2001), it is often challenging to make the distinction between behaviours representing OCD and ASD. Research does, however, indicate that individuals with ASD do meet DSM-IV-TR (APA, 2000) criteria for OCD. For an individual to be diagnosed with OCD, he/she typically has intrusive thoughts, impulses, or

images that produce anxiety (i.e., obsessions), and repetitive behaviours that are carried out to reduce anxiety (i.e., compulsions). Obsessive and/or compulsive symptoms must cause marked distress, take more than 1 hr a day and/or significantly interfere with the person's daily activities or relationships. In comparison to AOCP, OCD symptoms elicit anxiety and discomfort, and the repetitive behaviours of OCD serve the function of anxiety relief. In adults, the thoughts and behaviours of OCD are generally recognized as senseless, excessive, or unreasonable (insight); this does not apply to children with OCD who may lack sufficient cognitive awareness to make this judgment (APA, 2000).

As described above, the limited communication skills often displayed by children with ASD regarding internal events (Baron-Cohen et al., 1999; Gadow, Devincent, Pmeroy, &Azizian, 2005; Gillott et al., 2001), may make it difficult to differentiate OCD from AOCP. However, in the present study, we used standardized OCD instruments with acceptable psychometric properties such as the OCD module of the Anxiety Disorders Interview Schedule-Parent for DSM-IV (ADIS-P; Albano & Silverman, 1996) and the Child Yale-Brown Obsessive-Compulsive Scale (CY-BOCS; Goodman, Price, Rasmussen, Riddle, & Rapoport, 1986). Also, the Repetitive Behavior Scale-Revised (RBS-R; Bodfish, Symons, & Lewis, 1999) was used to capture repetitive behaviours characteristic of individuals with ASD. Interestingly, a recent study on the RBS-R by Mirenda et al. (2010) discussed a three-factor model comprised of: (a) Self-injurious behaviour; (b) Restricted Stereotypic behaviour; and (c) Compulsive, Ritualistic and Sameness behaviour. Regarding the third factor, ritualistic and sameness behaviours, such as mealtime rituals and insisting that things remain in the same place, loaded on the same factor as compulsive behaviour items (e.g., excessive washing/cleaning and hoarding). This suggests that these behaviours are qualitatively different from other forms of repetitive behaviour (i.e.,

self-injury and stereotypic behaviour), and similar to each other. Given the acknowledged difficulty in differentiating between OCD and AOCP, the present study will use the term Obsessive Compulsive Behaviour (OCB) to represent both phenomena.

Vulnerability to OCB in Children with ASD and Consequences of This Challenge

Anxiety disorders have been studied in children and youth with ASDs with these populations reportedly at greater risk for OCB in comparison to non-ASD clinic samples and non-clinic samples (Gadow et al., 2005; Gillott, et al., 2001; Sofronoff, Attwood, & Hinton, 2005; Tantam, 2000). Estimates from a number of studies have ranged from 1.5% to 81% (M = 16.7%) of individuals with ASD having comorbid OCB (de Bruin, Ferdinand, Meester, Nijs, & Verheij, 2007; Ghaziuddin, Tsai, & Ghaziuddin, 1992; Le Couteur et al., 1989; Leyfer et al., 2006; Muris, Steerneman, Marckelbach, Holdrient, & Meester, 1998; Rumsey, Rapoport, & Sceery, 1985). Research has also demonstrated that children with High Functioning Autism (HFA; those who are verbally fluent and possess an IQ >70) are more vulnerable to developing OCD when compared to typically developing children and those with Low Functioning Autism (Gadow et al., 2005).This may be in part due to higher cognitive and linguistic abilities that lend to verbalizing obsessions, thoughts, or beliefs required for the diagnosis of ASD (Fischer-Terwerth & Probst, 2009).

It is well documented that the presence of OCB can affect quality of life, stress levels, and family functioning. Moreover, it often influences peer acceptance, contributes to severe behavior challenges, and can alter the effectiveness of educational interventions (Brenton, Tonge, & Einfeld, 2006; Howlin, 1998; Kim, Szatmari, Bryson, Streiner, & Wilson, 2000; Reaven & Hepburn, 2003). Left untreated, anxiety may eventually lead to problems such as self-injury, depression, suicide, drug abuse, and social avoidance (Tantam, 2000). For these reasons,

research into the nature, assessment, and treatment of OCB should be seen as a major priority. The present study will be part of the first randomized controlled trial to examine Function-Based Group Cognitive Behavioural Therapy (FB-GCBT) as a treatment for OCB in school-age children with HFA.

Individual and Group Cognitive-Behaviour Therapy for OCD in Typical Children

Current literature supports the use of Cognitive Behavioural Therapy (CBT) for typical children and adolescents with OCD, and the OCD Expert Consensus Guidelines (March, Frances, Carpenter, & Kuhn, 1997) recommend CBT as the first line of treatment for children with OCD. Cognitive-behavior therapy for pediatric OCD typically consists of three components: (a) awareness training (AT), (b) cognitive therapy, and (c) graded exposure and response prevention (E/RP; March & Mulle, 1998). Awareness training involves describing the etiology of OCD and establishing that the symptoms of OCD are distinct from the child as a person. Cognitive interventions may include constructive self-talk and cognitive restructuring. Last, E/RP is the process of exposing the child or adolescent to a feared stimulus e.g. a dirty doorknob and the thought of getting sick) and preventing them from performing a compulsion (e.g. washing hands).

To date, there have been five randomized controlled trials of individual CBT for pediatric OCD (Barrett, Healy-Farrell, & March, 2004; Bolton & Perrin, 2008; Freeman et al., 2008; Pediatric OCD Treatment Study Team, 2004). A meta-analysis of these five studies showed that CBT was significantly superior to wait-list or placebo controls with a large effect size (ES = 1.45, CI_{95} = .68, 2.22; Watson & Rees, 2008). This therapy also had greater pooled effect sizes than pharmacotherapy. At present, individual CBT meets the requirements for designation as a

probably efficacious psychological intervention (Chambless & Hollon, 1998; Barrett, Farrell, Pina, Peris, & Piacentini, 2008).

Three uncontrolled trials and two controlled trials have been conducted on Group CBT as a treatment for typical children and adolescents between the ages of 8 to 17 years with a primary diagnosis of OCD. All three uncontrolled trials ($N = 71$) indicated significant decreases on the CY-BOCS (Goodman et al., 1989) following 7 to 14 GCBT sessions with large with-in group effect sizes ($M = 1.00$, [0.82-1.15]) (Barrett et al., 2008; Fischer, Himle, & Hanna, 1998; Himle, Fischer, Van Etten, Janeck, & Hanna, 2003; Martin & Thienemann, 2005; Thienemann, Martin, Cregger, Thompson, & Dyer-Friendman, 2001).

Barrett et al. (2004) provided the first controlled comparison ($N = 77$) of family-focused individual ($n = 24$) versus family-focused group CBT ($n = 29$) for children and adolescents (ages 7 to 17) with a primary diagnosis of OCD. Both treatment conditions were contrasted against a waitlist control group ($n = 24$). The treatment was adapted from the March and Mulle (1998) CBT manual and included a standardized family component. After 14 weekly sessions and two booster sessions, there were significant decreases on the CY-BOCS (Goodman et al., 1989) with large effect sizes for both the group ($d = 4.03$) and individual ($d = 3.27$) CBT groups, but not the waitlist controls ($d = -0.18$). Post hoc tests revealed no differences between the individual and group conditions ($d = 0.01$); however, individual ($d = 2.84$) and group ($d = 2.63$) conditions were significantly different from the waitlist condition. These gains were maintained at six-month follow-up.

A second randomized controlled trial by Asbahr et al. (2005) compared GCBT for OCD to pharmacotherapy. Forty children, ages 9 to 17 years, were randomized to either Sertraline ($n = 20$) or GCBT ($n = 20$). Similar to Barrett et al. (2004), the treatment was an adaptation of the

March and Mulle (1998) and consisted of 12 weekly sessions of 90 minutes. At post-treatment, participants from both GCBT and pharmacotherapy displayed significant decreases on the CY-BOCS (Goodman et al., 1989); however, those in the GCBT condition maintained lower rates of symptoms than those who received pharmacotherapy at nine-month follow-up. This study did not have enough information to calculate effect size. Although there is currently a limited amount of research conducted on GCBT as a treatment for OCD in children, existing research suggests that GCBT for OCD can be considered *possibly efficacious* (Barrett et al., 2008). Given the success of GCBT for children without an ASD, and the need for treatment of OCB in children with ASD, one approach is to modify current treatments to fit the needs of this population.

Preliminary Research on Individual Cognitive-Behaviour Therapy for OCD in Children and Youth with ASD

While CBT and GCBT have demonstrated improvements in OCD severity among typically developing children (without an ASD), there is a paucity of research investigating the efficacy of CBT in children with comorbid ASDs. Three case studies (Lehmkuhl, Storch, Bodfish, & Geffkin, 2008; Reaven & Hepburn, 2003; Sze & Wood, 2007) have evaluated CBT for OCD and these studies all suggested improvements in symptoms as a result of CBT. Two of these case studies adapted the March and Mulle (1998) CBT protocol, and worked with children between 7 and 12 years of age. Treatment included graded exposure to feared situations using a hierarchy; identifying and monitoring anxious thoughts, feelings, and OCD behaviours; developing and practicing coping statements and strategies in session and between sessions as homework; and parent involvement. Both studies used the CY-BOCS (Goodman et al., 1986) to rate the severity and pervasiveness of anxiety symptoms. From pre- to post-treatment

participants' CY-BOCS dropped from 23 (moderate) to 8 (sub-clinical; Reaven & Hepburn, 2003), 18 (moderate) to sub-clinical levels (Lehmkuhl et al., 2008). The authors reported that OCD symptoms remained well-controlled at follow-up. The third study (Sze & Wood, 2007) involved an 11-year-old girl with HFA, OCD, and other anxiety disorders. Treatment included an adaptation of the "Building Confidence" family CBT protocol (Wood, Piacentini, Southam-Gerow, Chu, & Sigman, 2006). The treatment included similar components to the above studies, with the inclusion of components targeting social skills and self-help skills. After 16 sessions, the participant no longer met criteria for targeted anxiety disorders (including OCD) on the ADIS-C/P (Albano & Silverman, 1996), and her parents reported improvements in multiple areas of functioning at home, socially and at school.

A fourth study used a function-based assessment and intervention, and an adapted March and Mulle (1998) protocol to treat two children (ages 8 and 10) with comorbid OCD and HFA (McCambridge, 2009). For both children, functions identified by the Questions About Behavior Function (QABF; Matson & Vollmer, 1995) and clinical observation included escape from anxiety, escape from task, and social positive reinforcement. These were addressed using function-based interventions including differential reinforcement of alternative and low rates of behaviours, and extinction. A multiple baseline across behaviours represented by parent report data-collected via questionnaire of the children at home indicated clinically significant reductions in OCD symptoms. At post-test, children decreased from 30 and 31 (severe) to 17 and 10 (mild) on the CY-BOCS (Goodman et al. 1989), did not meet criteria on the ADIS-P (Albano & Silverman, 1996) for OCD, and parents reported increases in quality of life. Brief relapses occurred throughout treatment and follow-up for both participants, and were addressed during treatment and booster sessions.

Only one randomized controlled trial (N = 40) investigating CBT for anxiety in children 7 to 11 years of age included eight children with OCD and HFA (Wood et al., 2009). Children were randomized to either immediate treatment (n = 17) or wait-list control (n = 23) conditions. Treatment consisted of a version of the "Building Confidence" CBT program (Wood & McLeod, 2008) modified for use with children with HFA. Enhancements included modules which addressed poor social skills, adaptive skills deficits, circumscribed interests and stereotypies, and poor attention and motivation. According to the Clinical Global Impression (CGI) – Improvement Scale (Guy, 1976), a seven-point scale ranging from *very much improved* to *very much worse*, all but one treatment completer in the immediate treatment group met criteria for a positive response to treatment compared to only 2 of 22 children in the wait-list condition. Post-treatment scores were also lower in the intervention group than in the waitlist group for the ADIS-P (ES = 2.46), and the parent report Multidimensional Anxiety Scale for Children (ES = 1.23), but not for the child report Multidimensional Anxiety Scale for Children (ES = 0.03). Reported gains were maintained at three month follow-up. These studies provide preliminary evidence for CBT as an effective treatment for anxiety and OCD symptoms in children with ASD.

Modifications to CBT

The above studies exploring individual therapy included a number of modifications to treatment to meet the needs associated with children's HFA diagnoses. These modifications included: parental involvement, behaviour reward systems, a simplified cognitive component, incorporation of a child's interests and ideas, emphasis on the use of visuals, functional assessment and intervention, and role playing (Lehmkuhl, et al. 2008; McCambridge, 2009, Reaven & Hepburn, 2003; Sze & Wood, 2007; Wood et al., 2009).

Preliminary Research on Group Cognitive-Behaviour Therapy for Children with Anxiety and HFA

One randomized controlled trial included individuals with OCD symptoms (no diagnosis) and ASD in their evaluation of GCBT for anxiety. Sofronoff et al. (2005) randomized 71 children with ASD (ages of 10 to 12) to either a 6-week GCBT for general anxiety symptoms (including OCD symptoms) or a waitlist control. The Sofronoff et al. (2005) treatment, called *Exploring Feelings,* included a number of cognitive strategies to address anxiety; emotion identification, relaxation techniques, and cognitive strategies, developing different tools to combat anxiety. Compared to waitlist controls, at 6 week follow-up, treated children had significantly lower OCD symptom severity as reported by the Spence Child Anxiety Scale-Parent Version (SCAS-P; Nauta et al., 2004).

Following these studies, we (researcher was second author) used a multiple baseline across behaviours design to evaluate GCBT for OCD in two children (ages 7 and 9 years) with HFA. A FB-GCBT protocol (entitled "*I believe in ME, not OCD!*") designed specifically for children with HFA and OCD was piloted in a ten week dyad therapy (Rombough, 2011). It included the standard components of CBT with a functional behavioural assessment and social skills training. Similar to McCambridge (2009), the functional behavioural assessment consisted of the QABF (Matson & Vollmer, 1995), as well as Antecedent-Behaviour-Consequence (Cooper et al., 2007) data collected using video probes. Traditional CBT techniques were used to address anxiety reduction functions, while other functions (e.g., escape and attention) were addressed with differential reinforcement and extinction. For both children, results indicate clinically significant decreases in targeted OCD symptoms following function-based CBT

treatment, and increases in quality of life. Interestingly, visual inspection indicated that parent report data corresponded with video probes with high accuracy.

Secondary Benefits Associated with GCBT

Professionals and researchers have also begun to suggest that GCBT may provide a variety of additional therapeutic benefits beyond OCD symptom reduction. Chalfant, Rapee and Carroll (2006), and Reaven and colleagues (2009) reported anecdotally that, during GCBT, it was the first time parents observed their child interact in a positive and relaxed manner with peers and adults, as well as form positive, reciprocal friendships. In addition to the social benefits, GCBT may also allow children to experience additional exposures and coping skills through the other participants. These additional exposures and modeling of appropriate coping skills may aid in relapse prevention (Fischer et al., 1998). Children also experience peer support, modeling, feedback and reinforcement, likely enhancing the therapeutic benefits of the CBT protocol (Martin & Thienemann, 2005). GCBT may also serve to normalize the OCD diagnosis by exposing children to others with similar behavioural characteristics (Asbahr et al., 2005; Fischer et al., 1998). Lastly, group therapy can be a more cost-effective service than the individual format of this treatment by reducing the amount of therapist time required.

Purpose

The present study investigated the efficacy of FB-GCBT in treating OCB in children with comorbid HFA and OCB. In addition to traditional CBT components, the function-based approach includes the assessment of additional functions of OCB (other than escape from anxiety). There is a large body of research concerning the use of a functional approach to identify antecedent and consequent manipulations in the treatment of behavioral challenges (see Carr et al., 1999 for a review). Few studies, however, have attempted to use this approach to

address anxiety disorders, specifically OCD, in children with ASD. Preceded by two pilot studies investigating a Function-Based CBT program for OCB in children with HFA (McCambridge, 2009; Rombough, 2011) it is the next step towards empirical validation of this multimodal treatment package. This study *replicates* the current research by:

- Modifying the CBT protocol to meet the cognitive, linguistic, and social needs of children with HFA (e.g., Lehmkuhl et al., 2008; Reaven et al., 2009; Reaven & Hepburn, 2003). Part of this extension includes a workbook entitled "I believe in ME, not OCB!" (Vause, Neil, & Feldman, 2010a; Vause, Neil, & Feldman, 2010b) that includes an emphasis on visuals, concrete language, and multiple opportunities for interaction.

- Using a single-case experimental multiple baseline design across behaviours to systematically evaluate the effects of treatment on targeted behaviours. Video and picture probes for two of four participants also allowed us to systematically evaluate correspondence of parent and research ratings of behaviour.

- Including secondary outcome measures examining children/parents' quality of life, social responsiveness, and consumer satisfaction.

This study *extends* upon the current research by:

- Adding an intensive parent training component, in which parents are taught to independently apply the components of the FB-GCBT protocol to their child's targeted OCBs.

- Including a measure of repetitive behaviour (the Repetitive Behaviour Scale-Revised; RBS-R; Bodfish et al., 1999) as an indicator of treatment efficacy and as a tool to inform the assessment of OCBs using the CY-BOCS.

Hypotheses

Based upon the results of previous studies investigating individual and group CBT as a treatment for OCD/anxiety symptoms in children with HFA, the following hypotheses were tested:

1. As measured by the ADIS-P (Albano & Silverman, 1996), CY-BOCS (Goodman et al., 1986), RBS-R (Bodfish et al., 1999), SCAS-P (Nauta et al., 2004), and parental/researcher informant and probe data, participants will experience a clinically significant decrease in their OCB (or lose their diagnosis) as a result of receiving the FB-GCBT.

2. As measured by the Child Obsessive Compulsive Impact Scale-Revised-Parent (COIS-RP; Piacentini, Peris, Bergman, Chang, & Jaffer, 2007) and the Family Quality of Life Questionnaire (Feldman, Condillac, Tough, Hunt, & Griffiths, 2002), participants and their families will experience a clinically significant increase in their overall quality of life as a result of the children receiving FB-GCBT.

3. As measured by the Social Responsiveness Scale (SRS; Constantino, & Gruber, 2005), will participants will experience a clinically significant decrease in their social impairment as a result of receiving FB-GCBT.

Method

Participants and Setting

See Table 1 for a summary of demographic, diagnostic information, pre-treatment OCB severity and secondary outcome measures (explained below). Participants were four children between the ages of 7 and 11 years ($M = 9.28$) at time of assessment. All children had an independent diagnosis of ASD from a psychologist or developmental paediatrician at entry; our research reliable assessor confirmed the diagnosis of ASD using the Autism Diagnostic Interview-Revised (ADI-R; Lord, Rutter, & Couteur, 1994),

Table 1

Participant demographic, diagnostic, and pre-treatment scores

Participant	Gender	Age (yr)	IQ	RBS-R			CY-BOC S	COIS-RP
				Sameness	Ritualistic	Compulsive		
Abigail	F	7	108	20	14	19	*	47
Jackson	M	9	124	21	10	15	29	34
Mason	M	11	110	19	9	11	26	45
Peter	M	8	80	20	11	14	26	58

* Unable to calculate total score because participant was unable to articulate Obsessions.

Criteria for HFA (IQ greater than 70 and verbally fluent; Thede & Coolidge, 2007) was assessed using the following: (a) the short form of Weschler Intelligence Scale for Children-4th Edition (WISC-IV; Weschler, 2004) which consisted of the following subtests: vocabulary, similarities, matrix reasoning, and coding; and (b) a clinical responding test developed by the first author (see Appendix A). Mean estimated IQ was 105.5 (range = 80 – 124). Additionally, the Vineland – II (Sparrow, Cicchetti, & Balla, 2005) assessed participants' communication (range: low to average), daily living skills (range: low to moderately low), and socialization skills (range: low to moderately low).

The clinical responding test was administered in a semi-structured format and included receptive and expressive language questions that were modeled after those in Module 3 of the Autism Diagnostic Observation Schedule (Lord, Rutter, DiLavore, & Risi, 1999), a module intended for children with fluent speech. The clinical responding test was scored as pass or fail based on the child's ability to answer the questions. All children were able to answer the majority of questions, and were able to communicate in full sentences.

At baseline, children met criteria for a diagnosis of OCD on the ADIS-P (OCD module); a "gold standard measure" for assessing OCD (Albano & Silverman, 1996). Symptom severity was assessed using the CY-BOCS (Goodman et al., 1986) with three participants having a mean

score of 27 (range = 26 - 29), and one participant having an incomplete score due to her inability to articulate obsessions. Given the modifications made to the CY-BOCS (see below) severity scores are not described. Items endorsed in the sameness, ritualistic, and compulsive subscales of the RBS-R (Bodfish et al., 1999) were probed during the administration of the CY-BOCS.

Mean score on the COIS-R (Piacentini et al., 2007) was 46 (range = 34 – 58) with a total possible score of 156, indicating participants experienced significant interferences in their day-to-day functioning. Participants scored in the moderate to severe range of the SRS indicating deficiencies in reciprocal social behavior that are clinically significant and a severe interference in everyday social interactions. During the course of assessment and treatment, participants were not involved in any other active treatment for any anxiety disorder or repetitive behaviour, three were medication free and one was taking a stable dose of Strattera and no participants were receiving intensive behavioural intervention.

Treatment sessions were conducted in a large meeting room at the Jack and Nora Walker Lifespan Development Research Centre, Brock University, St. Catharines, Ontario. Several chairs, tables, and a video camera were located in the rooms. A smaller room, with one table and a few chairs, was utilized for parent training. Two therapists, including one Master's level student and an undergraduate student, administered the treatment group. A second Master`s student observed the treatment sessions and was present for selected parent training sessions, and one undergraduate student observed the treatment sessions. Four children and their parents attended the group. All treatment sessions were videotaped.

Materials

Eligibility Assessment Tools.

Autism Diagnostic Interview-Revised (ADI-R). Diagnosis of AS or HFA will be confirmed using the Autism Diagnostic Interview-Revised (ADI-R; Lord et al., 1994). The ADI-R is a standardized, semi-structured clinical review for caregivers of children and adults. The interview contains 93 items and focuses on behaviours in three content areas or domains: quality of social interaction (e.g., emotional sharing, offering and seeking comfort, social smiling and responding to other children); communication and language (e.g., stereotyped utterances, pronoun reversal, social usage of language); and repetitive, restricted and stereotyped interests and behaviour (e.g., unusual preoccupations, hand and finger mannerisms, unusual sensory interests. The ADI-R is considered "gold standard" and has acceptable psychometric properties (Lord et al., 1994). The phone interview version has recently been validated (Ward-King et al., in press).

Wechsler Intelligence Scale for Children-Fourth Edition (WISC-IV)-short form. The WISC–IV (Wechsler, 2004) is a standardized test of intelligence for children age 6–16 years. It examines verbal and nonverbal intelligence performance and provides age equivalents and standard scores for each. The WISC–IV generally demonstrates good psychometric properties (Wechsler, 2004). A four subtest short form of the Wechsler Intelligence Scale for Children-4th Edition (WISC-IV; Wechsler, 2004) will be utilized to obtain an estimate of general intelligence as part of the screening process, and research has demonstrated that using short forms to predict IQ is not compromised in children with autism who show an atypical profile (Minshew, Turner, & Goldstein, 2005). The four subtests to be administered are: Similarities, Vocabulary, Matrix Reasoning, and Symbol Search. These four subtests give a reliable estimate (.93) of Full Scale I.Q. (Sattler, 2008).

Vineland Adaptive Behavior Scales-Second Edition; Parent/Caregiver Rating Form (VABS-II). The Vineland Adaptive Behavior Scales (Sparrow, Cicchetti, & Balla, 2005) evaluates adaptive functioning in four domains: Communication, Daily Living Skills, Socialization, and Motor Skills. Age Equivalent scores and Standard Scores (M = 100; SD = 15) are provided for each domain, and scores across domains can be combined to create an overall Adaptive Behavior Composite score (ABC). The Vineland-II norms are based on a large, representative sample (>3,000). The "Parent/Caregiver Rating Form" version will be used in this study. This version is administered as a parent/caregiver-report questionnaire where each item on the VABS is rated 0 (*no, never*), 1 (*sometimes or partially*), 2 (*yes, usually*), or DK (*don't know*), although some items may be rated N (*no opportunity*). The VABS-II demonstrates good reliability and validity (Sparrow et al., 2005).

Pre- and post-treatment primary measurement tools.

Anxiety Disorders Interview Schedule-Parent for DSM-IV-OCD Module (ADIS-P). The OCD module of the Anxiety Disorders Interview Schedule-Parent for DSM-IV (ADIS-P; Albano & Silverman, 1996) was used to determine if participants met diagnostic criteria for OCD. The ADIS is a semi-structured interview schedule that is consistent with the DSM-IV criteria for diagnosis of childhood anxiety disorders. Child and parent versions of the ADIS (ADIS-C/P) have demonstrated good inter-rater and retest reliability (Piancentini & Bergman, 2000). The ADIS-C/P has demonstrated good sensitivity to treatment effects in both childhood anxiety research (Barrett, Dadds, & Rapee, 1996) and childhood OCD research (Knox, Albano, & Barlow, 1996). The ADIS-P has also been used in other investigations CBT for anxiety in children with a PDD (Chalfant et al., 2006; Sze & Wood, 2007).

The Repetitive Behavior Scale-Revised (RBS-R). The RBS-R (Bodfish et al., 1999) is a rating scale for measuring the presence and severity of repetitive behaviours. It is a 43-item measure with items rated on a four-point Likert-type scale ranging from (0) *behaviour does not occur*, to (3) *behaviour occurs and is a severe problem.* It has six conceptually derived subscales (Stereotyped Behaviour, Self-injurious Behaviour, Compulsive Behaviour, Ritualistic Behaviour, Sameness Behaviour, and Restricted Behaviour). Internal consistency for the subscales ranges from .78 to .91 (Lam & Aman, 2007). Inter-rater reliability for the subscales ranges from .57 to .73 when administered for children and adolescents (Lam & Aman, 2007). Lam and Aman (2007) have also developed preliminary norms for each of the subscales using a sample of 307 parents and caregivers of children and adults with ASD.

Child Yale-Brown Obsessive Compulsive Scale (CY-BOCS). The CY-BOCS (Goodman et al., 1986) is a 10-item, clinician-rated, semi structured interview used to assess the severity of OCD symptom experienced during a 1-week period. The instrument rates the severity of both obsessions and compulsions across five scales: (a) time occupied by symptoms, (b) interference caused by symptoms, (c) distress related to symptoms, (d) resistance of symptoms, and (e) degree of control over symptoms. The CY-BOCS also provides a total severity score. Psychometric properties of the CY-BOCS are excellent; it has high internal consistency for the CY-BOCS Total Score (Scahill et al., 1997; Storch et al., 2004) and obsession and compulsion severity scores (Storch et al., 2004); and convergent and divergent validity (Storch et al., 2004). For the purposes of this study, we have made three additions to the CY-BOCS including: (a) providing examples for each of the items on the Obsessions and Compulsions Checklist adapted from Piacentini, Langley, and Roblek (2007); (b) additional prompts were added to aid in

scoring the 10 items; and (c) avoidance was scored as a compulsion similar to the Yale Brown Obsessive Compulsive Scale (Y-BOCS): II (Goodman, Rasmussen, Price & Storch, 2006).

Secondary outcome assessments.

Child Obsessive Compulsive Impact Scale-Revised Parent Reports (COIS-RP). The COIS-RP (Piacentini et al., 2007) is a 27-item, parent-report questionnaire that assesses OCD-related impairment in different areas of the child's functioning, including school, social, and home/family activities. For each item, the parent or child rates the child's level of impairment on 4-point Likert scale from *not at all* to *very much.* The COIS-RP has strong internal consistency and good test–retest reliability (Piacentini et al., 2007).

The Family Quality of Life Questionnaire. The Family Quality of Life Questionnaire (Feldman et al., 2002) is 8 item instrument rates the extent that a child's problem behaviours (in this study, obsessive-compulsive behaviours) interfere with their quality of life and daily functioning. Items on this assessment tool cover such areas as daily activities/routines, community integration, participant's peer relationships, learning, family stress, family social functioning inside and outside of the home environment, and positive response by others towards the child. A Likert scale is used which ranges from 0 *(minimally)* to 7 (*extremely)*. All items are reverse scored with high scores on this instrument indicating that OCD causes less disruption to a child's quality of life and daily functioning.

Spence Children's Anxiety Scale (SCAS). The SCAS (Nauta et al., 2004) was developed to assess anxiety symptoms in children. It has 44 items on a 0 (never) to 3 (always) scale and consists of six subscales; Panic attack and agoraphobia, Separation anxiety disorder, Social phobia, Physical injury fears, Obsessive compulsive disorder, and Generalized anxiety disorder. The scale has shown high internal consistency, not only for the total score but also for each

subscale, with satisfactory test retest reliability (Essau, Muris, & Ederer, 2002; Spence, 1998; Spence, Barret, &Turner, 2003). In addition, the SCAS has been found to show both convergent and divergent validity with both children and adolescents (Essau et al., 2002; Spence, 1998; Spence, Barrett, & Turner, 2003).

Social Responsiveness Scale (SRS). The Social Responsiveness Scale (Constantino, & Gruber, 2005) is a 65 item questionnaire, administered to parents or teachers, which measures a child's ability to engage in appropriate social interactions. The SRS will be completed by each parent in this study at pre- and post-treatment assessments. The SRS generates a total score and a score for five subscales: social awareness, social cognition, social communication, social motivation and autistic mannerisms. Both gender specific standardized total scores and standardized subscale scores (M = 50, SD = 10) are provided. The SRS also demonstrates good psychometric properties and has been tested in studies involving over 1,900 children aged 4-15 years (Constantino & Todd, 2003).

Consumer satisfaction questionnaire. The Consumer Satisfaction Questionnaire (Feldman et al., 2002) involves a caregiver rating how satisfied they are with the CBT intervention their child has received. This brief self-report utilizes a 7 point Likert scale ranging between 1 *(not at all satisfied)* to 7 (*very satisfied)* to rate 9 items. These items assess how satisfied one feels about his or her involvement in the CBT intervention, the specific treatment components, data collection, the therapists, and the effectiveness of the intervention. This measure was administered at post-treatment only.

Time series tools.

Parent report. *Parent reports* were designed using Rombough's (2011) parent report of OCBs as a guide. Information obtained from the CY-BOCS (Goodman et al., 1986), along with

parental input, was used to create operational definitions of each child's targeted OCBs (see Appendix B for a list a description of each child's treated OCBs) and an individualized data collection form was created. Targeted OCB's were rated by parents daily using a Likert scale ranging from 1 to 5. Likert scale items ranged from 1 (*desired post-treatment levels of OCBs*) to 5 (*pre-treatment levels of OCBs*). See Appendix C for a sample of a Parent report. For selected OCBs observational probes were recorded from digital recordings and pictures of participants' and their natural environments; see below for a description.

Functional assessment.

Questions about Behaviour Function (QABF) – Revised. The QABF (Matson & Vollmer, 1995) is an indirect assessment of behavioural function that consists of 25 items designed for the functional assessment of behaviour problems in persons with developmental disabilities. Parents/caretakers familiar with the individual rate each item. The instrument yields five categories reflecting the behavioural functions of Attention, Escape, Physical, Tangible, and Non-social Reinforcement. Each question is scored along a four point likert-type scale anchored with frequency descriptors of *Never*, *Rarely*, *Some*, and *Often*. All potential functions are addressed, however, the subscale(s) with the highest total rating(s) is considered to be the primary function(s). Inter-rater agreement on the of the QABF has been found to range between .96 to .98, with test-retest reliability on the six function factors ranging from .86 to .99 for individuals in this population (Singh et al., 2006). Five additional items based upon the DSM-IV-TR (APA, 2000) have been added to the adapted version of the QABF used in this study to take into account maladaptive behaviours which serve an anxiety reduction function. See Appendix D for a copy of the questions added to the QABF.

Functional Assessment Interview. After administering the QABF, we completed a behavioural interview with parents using questions adapted from Woods & Miltenberger (2006). In the interview, we asked questions about the antecedents and consequences of their children's OCBs in order to gather further detail on the functions of each behaviour as identified by the QABF.

Research Design

A within participant multiple baseline design across behaviours (Cooper et al., 2007) was used to investigate the effects of the FB-GCBT on parent reports of OCBs for three of four participants. Video probes (see below) were conducted for 4 of the seven behaviours for Abigail and picture probes were conducted for one behaviour for Mason. Three phases were included in the design; (a) baseline, (b) AT, and (c) function-based assessment and intervention (FBA/I), CBT skills training, and ERP. The first phase of treatment, AT, consists of treating a child's OCBs collectively, as recommended by existing CBT manuals for OCD in children (March & Mulle, 1998). The second phase; FBA/I, CBT Skills Training, and ERP, was considered the active treatment phase since ERP has repeatedly been found to be the active ingredient in reducing OCBs (e.g. McLean et al., 2001; Steketee, 1993).

An additional 13 behaviours from all four participants (one of Abigail's, five of Jackson's, three of Mason's, and four of Peter's) were evaluated using ABC designs comprised of; (a) baseline, (b) AT, and (c) FBA/I, CBT skills training, and ERP. ABC designs were used for behaviours where the data was not appropriate to graph in the multiple baseline designs. Given the number of behaviours we were treating for each child, some target behaviours were introduced into the FBA/I, CBT skills training, and ERP phase prior to a demonstration of a reliable decrease of previously treated behaviours in order provide treatment for as many

behaviours as possible during the nine-week treatment group. Thus, these behaviours were analysed using ABC designs.

Pair-wise *t*-tests were used to evaluate significant change in the means of the last three data points in each phase (Thompson, 2008). Standardized assessments and questionnaires were evaluated using a pre-post design.

Baseline

During an initial home visit, a therapist reviewed the target symptoms from CY-BOCS (Goodman et al., 1986) obtained in the assessment with the child and his/her parents. The mean number of compulsions identified by the independent assessor was 14.75 (range = 9 - 18) and the mean number of obsessions was 9 (range = 4 - 16). A therapist reviewed the definition of "severe" as outlined on the CY-BOCS and had parents confirm the four behaviours identified as "most severe" by independent assessors. Across all participants, the four behaviours identified as "most severe" in pre-test remained the same at baseline, with the exception of two behaviours (one behaviour for each Abigail and Peter was replaced by a behaviour indicated as a greater priority for treatment by the parents). Parents were then instructed to select up to an additional six compulsions to be targeted in treatment, using the definition of "severe" as outlined on the CY-BOCS. Given that parents were going to be rating the occurrence of OCBs and many children could not identify, or had very limited information concerning obsessions, the primary focus was the compulsions.

Information gathered in the home visit was used to develop the anchors for the parent report sheets (See Appendix C for a sample). Parent report sheets were delivered (as an electronic version or paper copy) one to two weeks later and parents were instructed on how to collect data using the questionnaires. Parents were instructed to complete the parent report forms

at the same time every day. One week after they began to collect data, researchers telephoned the parents to ensure data was being collected as instructed, addressed concerns of the parent and child, and make any necessary changes to the parent report sheets.

Observational probes Observational probes were recorded from digital recordings and pictures of participants' and their natural environments. Behaviours were selected if overt, occurring in a discrete period of time, and in a location where recording was possible. Second, the parent had to be willing to collect observational probes in the home. Parents were instructed to record the entire duration of selected behaviours three times a week in settings and during times in which they reported the target OCBs were most likely to occur. Random days were selected by the researcher and given to the parents each week. Videotapes of OCBs were coded by the primary investigator using the same Likert scale used in the parent reports. For two of five behaviours (one of each Mason`s and Abigails), probes did not capture enough information to rate in the same manner as on the Parent reports and a Likert scale question was developed to rate these behaviours (See Appendix E for sample questions used to rate probes). For example, Mason's hoarding behaviours were captured with photos of the drawers in his room, but due to a lack of photographs of every drawer, they were rated on how cluttered, rather than the number of drawers filled with clutter. Baseline data was collected for three and a half weeks to ensure stability of behaviours, at which point, treatment commenced.

Treatment Package

The Function–Based CBT intervention was guided by a manualized treatment protocol developed by Vause et al. (2010a) and an accompanying workbook developed by Vause et al. (2010b; see Appendix F for sample pages of the workbook). Treatment involved nine weekly sessions each lasting 2 hours, which included group activities, separate parent and child group

meetings, and work in parent-child dyads. The groups consisted of two therapists, four children, and at least one parent accompanying each child. Concepts outlined in the manual are based on mainstream cognitive-behavioural approaches discussed by well-known researchers for the general paediatric population (e.g., Piacentini et al., 2007; Freeman & Garcia, 2009; Attwood, 2004; March & Mulle, 1998). These concepts and techniques are modified (see Table 2 for a list of treatment enhancements) to meet the cognitive, linguistic, and social needs of children with HFA. An FBA/I component was incorporated into treatment to address all functions other than escape from anxiety for each of the children's OCBs. The FBAs aimed at deriving the possible antecedents and consequences maintaining the targeted behaviours and all identified functions were addressed in FBIs.

Phase 1: Awareness training (AT). .

The initial two sessions focused on introducing group expectations, rapport building, and an introduction to OCB with an emphasis on relating OCB to specific child behaviours. During these sessions, to promote awareness of compulsions and obsessions based on definitions outlined in workbook, each child created a concrete list of obsessions and compulsions that were tackled in treatment and began to map out his/her OCBs with the assistance of a therapist.

Therapists ensured that all OCBs rated as "most severe" on the CY-BOCS were included on the list. Participants created a fear thermometer and used this to "rate their fears" or let us know how distressed they would feel if they couldn't engage in their compulsions. After rating these behaviours, the children mapped their OCB behaviours on a hierarchy modified into three concrete sections for this population which represented children's distress and resistance in performing OCBs. This map enabled the therapist to determine what order the OCBs will be targeted during treatment (see Appendix G for a copy of the map).

Table 2

List of Treatment Enhancements

Treatment Enhancements	
High parental involvement	Parents attended all sessions, assisted their child with session activities/therapeutic homework, carried out FBIs, and collected probe data/filled out parent reports.
Strong emphasis on visuals	The children's workbook contained visuals of all CBT/OCD concepts and activities
Use of schedules for predictability in session/with homework assignments	Weekly session schedules were presented in the workbook and on a whiteboard located at the front of the therapy room.
Session rules	Session rules were discussed/reviewed weekly and emphasized participation in group discussion, completion of session activities, and demonstrations of compliant behavior.
Choice making	Treatment choices in the therapeutic/home environment consisted of: deciding to write/draw session activities, choosing how to carry out ERP homework assignments, selecting which CT and/or BST tools to incorporate into treatment plans, and deciding on what type of reinforcers to receive for participation and compliance.
In session token system	Each child earned a wrapped prize at the end of each session if they could collect ten stickers for following session rules.
Reinforcers delivered in session/at home	The children were provided with daily rewards for completing CBT homework assignments, as well as delayed reinforcers for completing more long-term OC specific goals.
Incorporation of participant's interests	The children's interests were incorporated into treatment to keep them engaged in the therapeutic process (e.g., all mystery prizes, token stickers, and session activities/games included things that the children enjoyed doing/playing with).
FBA/I	Parents were administered the QABF and a functional assessment interview. All functions identified were addressed with differential reinforcement of alternative or low rates of behaviours, and for some behaviours extinction (Cooper et al., 2007) via a parent training and a parent homework sheet.

Note. Reprinted from *Dyad Function-Based Cognitive Behavioural Therapy as a Treatment for Obsessive Compulsive Disorder in Two School Aged Children with High Functioning Autism* by L. Rombough, 2011, Unpublished master's thesis. Reprinted with permission.

and children tracked their progress during treatment using this map. Children, with the help of parents and therapists, also generated some externalizing statements that they could use during ERP.

Phase 2: Exposure and response prevention + CBT skills training + functional behaviour assessment and intervention.

OCBs were targeted one to two at a time throughout the remaining weeks. CBT skills training involved teaching children coping statements which consisted of: (a) externalizing statements (e.g.," I don't have to listen to you OCB"), (b) positive self-statements (e.g. "I can do it. I'm not going to let OCB beat me"), and (c) concrete statements to challenge faulty assumptions (e.g. "sorry is not a bad word, people like it when I say sorry.") Children were taught imagery, ignoring, and distraction (talking about other things or doing other things) to cope with physical reactions to anxiety and to provide them with replacement behaviours for their compulsions.

The exposure phase of ERP involved a child (with assistance from the therapist and parent) creating a plan for gradual exposure to a thought (often associated with a feared object or situation) and loose blocking of the compulsion. For example, a child may have developed a plan that limited the number of times he/she could erase and rewrite letters during homework, gradually decreasing the amount of times throughout the week. For some participant behaviours, complete response prevention occurred. When possible, stimuli were brought from home and used to role-play CBT techniques. ERP exercises were meant to be practiced in both the session and in the home, where over the course of time, the child could be exposed to the anxiety provoking thought, more often and for longer durations of time without performing their OCBs.

One week prior to beginning ERP for each OCB, the QABF and the functional assessment interview were administered to a parent in order to determine additional functions other than anxiety reduction. Any function identified on either the QABF or the functional assessment interview was considered a hypothesized function. Functions were addressed with differential reinforcement of alternative or low rates of behaviours, and for some behaviours extinction (Cooper et al., 2007). See Appendix H for results and descriptions of each child's FBA/Is. This process of administering the QABF, providing the parent with differential reinforcement/extinction strategies for additional functions, and ERP, was repeated for each of the OCBs targeted throughout the remaining weeks.

Reliability

Interobserver reliability checks for the Likert ratings of each behaviour (see Appendix C) were conducted on 33% of randomly selected video and 30% of randomly selected picture probes across all participants and phases, by a researcher who scored independently. Reliability was calculated for each rating as the number of agreements (on the rated score) divided by the number of agreements plus disagreements multiplied by 100% (Cooper et al., 2007). Mean inter-observer reliability for all behaviours was 92% (range = 78% - 100%).

Treatment Integrity

All treatment sessions were videotaped. A treatment checklist for each session was created based on the primary goals of the treatment according to the Vause et al. (2010a) manual and fidelity checks were conducted by a trained observer viewing the videotapes of sessions in random order and complete checklists to ensure treatment components were carried out in session. Treatment integrity checks were completed for two of nine sessions (22.22%). Agreement on treatment components completed was calculated by dividing the number of

agreements by the number of agreements plus disagreements and multiplying by 100 (Cooper et al., 2007). Mean treatment integrity for two out of nine sessions was 100%.

Also, for one participant, we conducted treatment integrity checks concerning the parent's correct administration of the FBI protocol (see Appendix I for a sample parent homework sheet) in the home setting Integrity checks were calculated by dividing the number of agreements (correct administration of items on the FBI protocol) by the number of agreements plus disagreements and multiplying by 100% (Cooper et al., 2007). Treatment integrity using video probes was conducted on five of Abigail's behaviours and represented 14% of potential home exposures for those behaviours. Treatment integrity for four of the five behaviours was 98% (range = 98% - 100%). Treatment integrity for the last behaviour (avoiding the words "confession" and "sorry") was 20%. This behaviour appeared to cause considerable anxiety for Abigail and mom appeared to want to comfort her by providing attention when Abigail cried, or screamed when hearing the target words. Abigail's mother also failed to immediately direct her to a social story when this occurred, but noted reading the story several times per week.

Results

Multiple Baseline Designs

Figures 1 through 3 show the multiple baseline results across observation days for three participants. A multiple baseline of Jackson's behaviours can be seen in Appendix J, however all of his behaviours were analysed using ABC designs (see below). Using visual inspection, parent reports and probe data were analyzed. During baseline, two of seven (telling on sister and dad and avoiding confession/sorry) behaviours show considerable variability for Abigail, two of four (morning routine and reassurance about marks on body) for

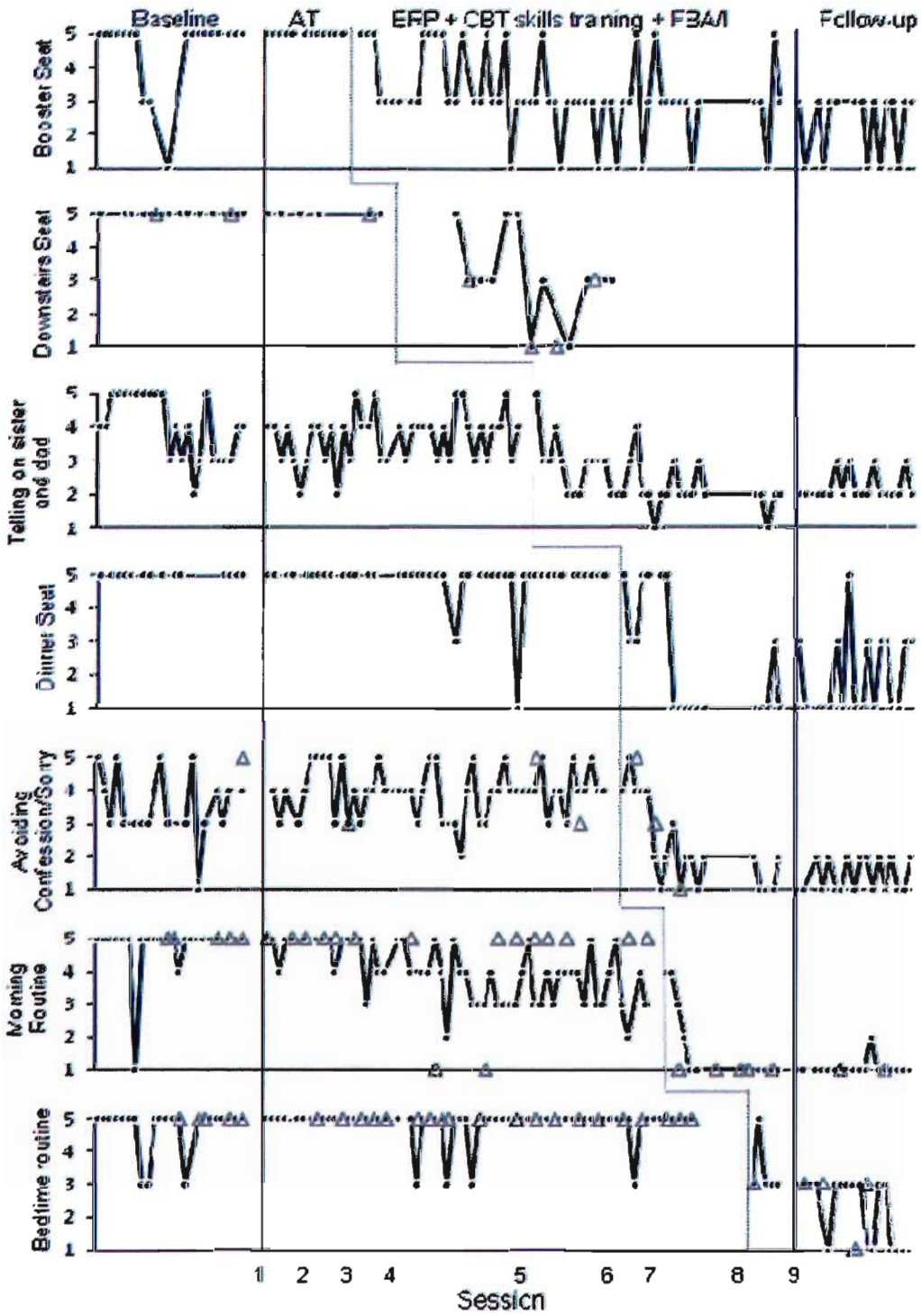


Figure 1. Multiple baseline across Abigails's treated OCBs using daily parent rated and video probe data. Black circles = parent rated, Grey triangles = video probe.

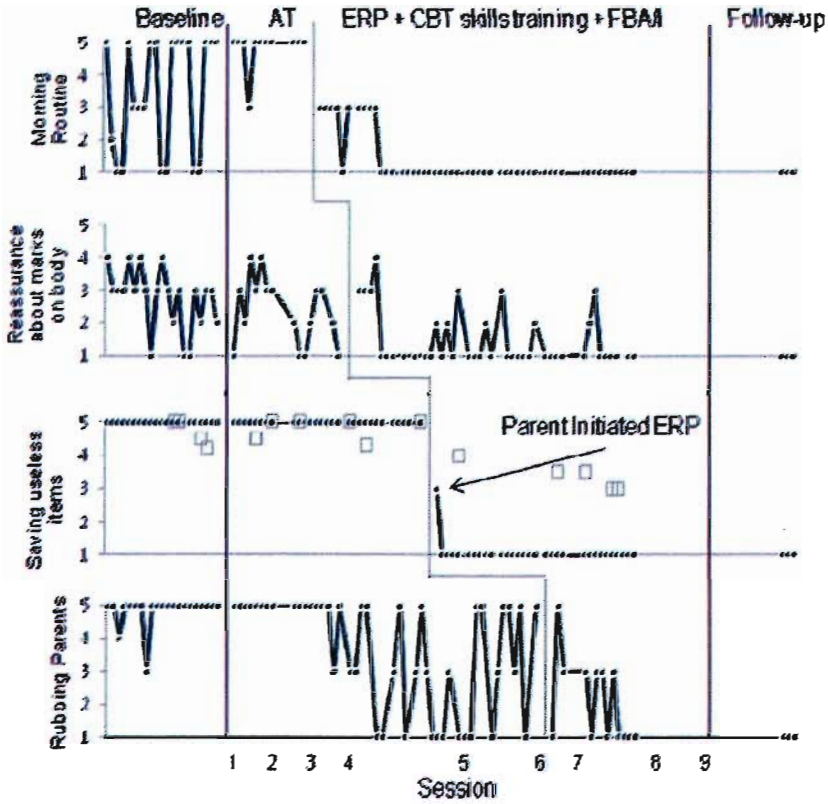


Figure 2. Multiple baseline across Mason's treated OCBs using daily parent rated and picture probe data. Graph 3: Black circles = parent rated, Grey squares = picture probe, rating of clutter.

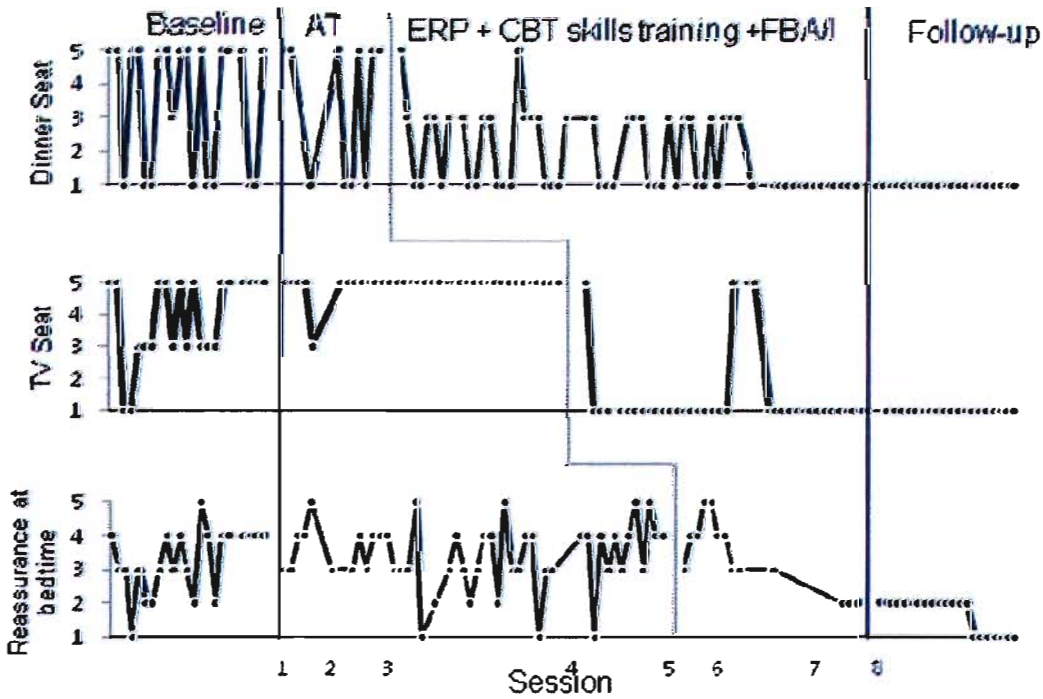


Figure 3. Multiple baseline across Peter's treated OCBs using daily parent rated data.

Mason, and all three for Peter. In the AT phase, behaviours remained at similar levels to baseline, with the exception of the fourth behaviour for Mason which was stable initially and then became variable. All parents reported decreases in target OCBs with the initiation of ERP, CBT skills training and FBA/I and improvements were maintained until the end of treatment. For all participants, target OCBs remained at low or zero levels into follow-up. At post-treatment and follow-up, Abigail`s graph shows an increase in sitting in the same seat at dinner; however, this represents her sitting in all seats around the dinner table every so often, including the seat that was targeted during treatment.

Between the fourth and fifth session, during a break from treatment and holidays from school, Mason`s parents initiated ERP for his saving useless items behaviour by having him empty out all the drawers in his room that were filled with seemingly useless objects. As can be seen from the data, this change was immediate and maintained throughout treatment and follow-up. Overall, Abigail showed the fewest non-overlapping data points between baseline/AT and implementation of ERP+ CBT skills training + FBA/I. For Mason's saving useless items, parent report and probes show no overlap between baseline/AT and the final phase.

Visual inspection of correspondence between parent report and probe data across all behaviours with video or picture probes indicated that the general trend was the same. Correspondence for some behaviours was lower due to different coding criteria (e.g., for Mason's hoarding and Abigail's morning routine; see procedural section for more detail), and probes capturing only one occurrence, but parents were rating on multiple observed occurrences (e.g., for Abigail's avoiding confession and sorry). Reliability between parent and researcher was calculated for behaviours where there was a maximum of one occurrence per day and both persons were coding on the same scale. This was calculated as the number of agreements (on the

rated score) divided by the number of agreements plus disagreements multiplied by 100% (Cooper et al., 2007). Correspondence between parent report and probe data for these two behaviours (Abigail's downstairs seat and bedtime routine) was 84% (range = 82% – 86%).

ABC Designs

Table 3 shows each participant's mean of all the data points in each condition, as well as the percentage decrease from the mean of the baseline data points to the mean of AT, and likewise from AT to ERP+CBT skills training + FBA/I. Mean rating of the 13 behaviours treated using the ABC designs was 3.65 in baseline, 3.70 in AT, and 2.81 in ERP+CBT skills training + FBA/I. Behaviours increased by a mean of 1% from baseline to AT, and decreased by a mean of 24% in the active treatment phase.

Pairwise *t*-tests and Pre-Post treatment Measures

Examining behaviors included in multiple baselines and ABC designs, twenty-two of twenty- eight (79%) behaviours showed decreases, four behaviours showed no change, and two behaviours worsened from baseline to ERP+CBT skills training + FBA/I. Similarly, pair wise *t*-tests (one-tailed) of the means of the last three data points in each phase for all treated behaviours revealed that target behaviours did not significantly decrease from baseline to AT, $t(27) = .23$, $p = 0.411$, but significantly decreased from baseline to ERP + CBT skills training + FBA/I, $t(27) = -5.24$, $p < 0.001$, and from AT to the final phase and FBA/I, $t(27) = -6.24$, $p < 0.001$.

Pre- and Post-Treatment Measures

At post-treatment, all four children still met DSM-IV-TR criteria for OCD using the OCD module of the ADIS (Albano & Silverman, 1999). Individual results on the CY-BOCS (Goodman et al., 1986) are presented in Figures 4 and 5. At post-test, scores of three

Table 3

Mean and Percentage Decrease in Each Phase for Behaviours Treated using ABC Design

		Mean of Target Behaviour			Percentage Decrease	
Name	Target Bx	Baseline	AT	ERP+FBA/I	Baseline to AT	AT to ERP+CBT Skills Training+FBA/I
Abigail	Difficulty throwing things away, collecting and saving useless items	2.33	2.16	1.7	8%	21%
Jackson	Have to sleep with books in bed	3.375	3.65	1.51	0%	58%
	Avoiding competition by running away	3.71	4.31	4.09	0%	5%
	Counting specks of dust, counting elastics, counting other things	2.17	1.98	1.70	9%	14%
	Must be in control	4.2	4.56	3.46	0%	24%
	Getting very upset when things go wrong	5	5	5	0%	0%
Mason	Collecting and saving useless items	3.72	3.91	2.83	0%	28%
	Asking a parent to answer the same question over and over	3.05	2.64	1.41	13%	47%
	Evening routine	3.67	4.36	1.72	0%	61%
Peter	Erasing and rewriting words	3.43	2.71	1	21%	63%
	Bedtime routine	5	5	5	0%	0%
	Arranging things	4.33	4.87	5	0%	0%
	Always has to go first	5	4.84	5	3%	0%

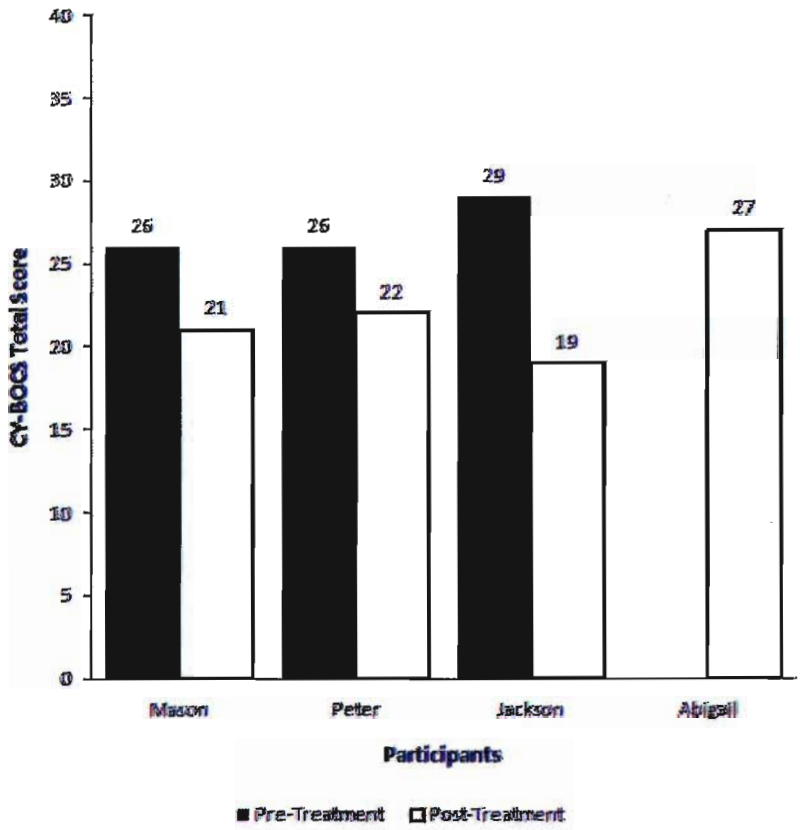


Figure 4. Individual scores on the Children`s Yale-Brown Obsessive Compulsive Scale at pre-treatment and post-treatment. AR`s pre-treatment score was incalculable due to inability to articulate obsessions.

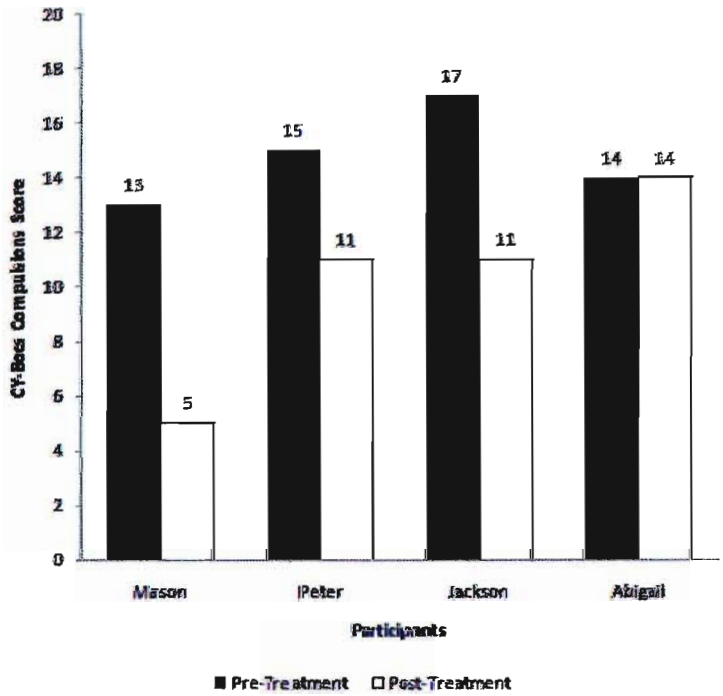


Figure 5. Individual scores on the Children`s Yale-Brown Obsessive Compulsive Scale - Compulsions at pre-treatment and post-treatment. Jackson`s post-treatment written assessment was not completed.

participants decreased an average of 23% (range = 15% - 34%) on the CY-BOCS and one participant had an incalculable pre-treatment score due to an ability to articulate obsessions. On the compulsions scale of the CY-BOCS, scores decreased an average of 31% (range = 0% - 62%). Means and standard error of the mean for each subscale at pre- and post-treatment on the RBS-R (Bodfish et al., 1999) are presented in Figure 6. At post-test, total scores decreased an average of 53% (range = 40% – 67%).

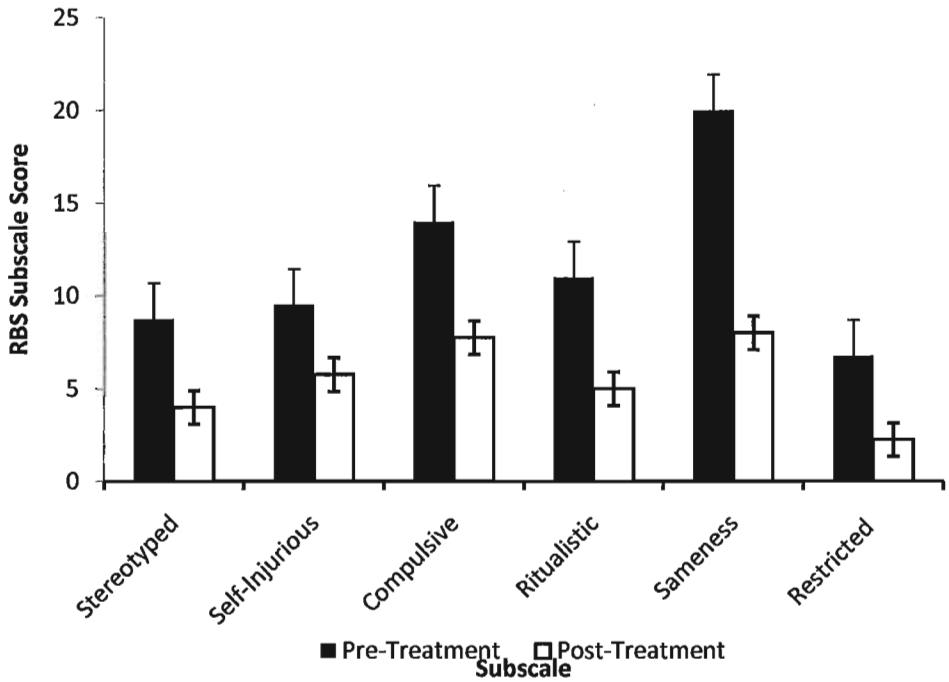


Figure 6. Mean scores on the Repetitive Behaviour Scale by subscale at pre-treatment and post-treatment.

Secondary Outcome Measures

Across all participants, scores on the COIS-RP decreased an average of 27% (range = 0% - 66%) and scores on the QOL decreased (indicating improvement) an average of 14% (range = 0% - 47%). On both the COIS-RP and QOL, Jackson's score increased from pre- to post-treatment. Abigail's QOL was not completed at post-treatment. On the SCAS, all participants

showed decreases in scores averaging 35% (range = 34% - 36%). However, on this measure, all participants remained in the moderate to severe range at post-treatment. Results of the Consumer Satisfaction Questionnaire indicated that Abigail's parent was extremely satisfied, Peter's was moderately satisfied, and Mason and Jackson's parents reported low satisfaction with the treatment components and its effectiveness. On the SRS, all participants remained in the same range from pre to post-test, but three of the four participants showed a decrease in score (mean decrease = 16.25; range = 0 - 45).

Discussion

This single-case design study, including four participants, demonstrated that FB-GCBT shows considerable promise in treating OCB in children with HFA. At post-treatment, the present study showed decreases in severity of OCBs (average = 23%) on the CY-BOCS for three of four participants, large decreases on broader measures, like the RBS-R (average = 53%; Bodfish et al., 1999) and significant pre- to post-treatment decreases with time series data. Similar to Rombough (2011), parent-rated time series data and video probes data showed medium to high correspondence indicating parents were accurate assessors of their child's OCBs. Previous function-based and single-case CBT studies (e.g., McCambridge, 2009; Reaven & Hepburn, 2003; Rombough, 2011) reported larger decreases in symptom severity on the CY-BOCS (average = 47%). In the present study, a smaller treatment effect may be related to our broad definition of OCD, which included sameness and ritualistic behaviours probed by the RBS-R (Bodfish et al., 1999). Previous studies have focused on symptoms included on traditional measures of OCD such as the CY-BOCS and/or ADIS. As a result of this broad definition, we may have been treating some behaviours that were not OCD symptoms, but rather

AOCP. What is clear, however, is that whether some of the behaviours treated in this study were OCD and others were AOCP, both responded to the treatment package.

Future research involving OCD and HFA should continue to evaluate the benefits of including functional behavioral assessment and intervention. In this study, the use of an indirect functional assessment identified perceived functions, in addition to anxiety reduction, of participants' compulsions. If some of the behaviours treated were in fact AOCP, it is possible that the function-based intervention mediated the decrease in these behaviours, as the CBT skills training and ERP would have mainly addressed the function of anxiety reduction. While an analogue functional analysis is the only way to identify cause (e.g., Iwata, Dorsey, Slifer, Bauman, & Richman, 1994; Vollmer, Marcus, Ringdahl, & Roane, 1995), given the number and low frequency of OCBs treated in the study, it would not have been possible. Recently, the viability of an analogue functional analysis was investigated in an unpublished master's thesis where Sheen (2011) used an analogue functional analysis of OCD-related behaviours displayed by an individual with ASD and the efficacy of a corresponding function-based treatment plan. Hoarding and packing decreased when parent implemented treatment targeted the identified functions of automatic reinforcement socially mediated positive reinforcement. This suggests the FBA/I components of the treatment package investigated in this study contribute to the decreases in OCB and functional assessment and intervention can also be effective as a standalone intervention.

When examining results of secondary outcome measures (e.g. the COIS-R and the QOL), the present study reported increases in quality of life; OCB interfered less with daily activities/routines, community integration, participants' peer relationships, learning, family stress, family social functioning inside and outside of the home, and positive response by others

towards the child. These increases were at comparable levels to previous research on GCBT in ASD (e.g., McCambridge, 2009; Ooi et al., 2008; Rombough, 2011). Three of our participants showed changes in total scores on the SRS but remained in the same range. While we did attempt to include social skills activities that addressed social-communicative challenges, minor changes were likely demonstrated because this was not the emphasis of the treatment program. More intensive social skills programming might be needed to demonstrate a change on this measure. Consumer satisfaction questionnaires indicated variable satisfaction with the treatment. The two parents who were most satisfied had the youngest children (7 and 8 years old), with lower IQ's (below 110), and one had the greatest treatment response. The two parents that were least satisfied with the treatment had children who were 9 and 11, had IQ's greater than 110, and one had the poorest treatment response according to the time series data. Although we treated a limited number of participants, it is possible that the treatment protocol is most effective and creates the greatest satisfaction for families with younger children (7 or 8) with highly involved parents.

Issues in Assessment

Multiple authors have acknowledged that measures based on *DSM-IV-TR* (APA, 2000) criteria for OCD may not be valid in diagnosing OCD in individuals with ASD (e.g. Bodfish et al., 1999; Fischer-Terworth & Probst, 2009). In our study, we used the RBS-R (Bodfish et al., 1999) to inform the CY-BOCS, which resulted in the inclusion of behaviours that might be considered typical of an ASD population, and less prevalent in an OCD population (e.g., bedtime routines, dressing routines, and sitting in a particular seat). However, during treatment, children began to verbalize obsessions for behaviours such as sitting in a particular seat, and morning routines. Abigail indicated that she sat in a particular seat while watching TV to avoid the

recliner. Sitting in the recliner was associated with general fears of bad things happening to her. Similarly, Mason revealed during treatment that if he did not complete portions of his morning routine, he would worry that he was not prepared all day and attempt to make up those portions in the evening or the next day.

Interestingly, behaviours that were included on the symptom checklist of the CY-BOCS appeared to serve functions other than to escape from anxiety. Mason's rubbing of his parent's arms, was captured under the touching, tapping, and rubbing item of the CY-BOCS, yet during probing in treatment, Mason indicated he performed this behaviour only to gain his mother's attention as did the QABF results.

Potentially, children may have clear obsessions or thoughts surrounding these behaviours, but they may not be captured on the assessment due to the child's inability to articulate thoughts, embarrassment, or misunderstanding the questions posed. Perhaps an assessment observation of the children's OCBs may have captured more information. These issues also indicate the importance of the functional assessment included in the study. Behaviours which may have initially been conceptualized as performing an escape from anxiety function were still addressed with the function-based interventions. Researchers should continue to develop assessments that more accurately assess OCB in children with HFA and other related disabilities.

In this study, active avoidance was also added to the CY-BOCS. Like other compulsions, active avoidance aims to reduce anxiety associated with an obsession, and increases in likelihood via negative reinforcement (McGuire et al., 2011). Typically, if a child avoids a feared stimulus to reduce anxiety (e.g. avoiding touching items that are dirty), this is not recorded on traditional assessments (e.g., CY-BOCS, ADIS). Yet, if a child was to perform anything other than avoidance to reduce anxiety to the same feared stimulus (e.g., washing hands repeatedly) this

would be counted in the total score. Hypothetically, a child could show complete remission of OCD on the CY-BOCS by simply switching their current compulsions to avoidance behaviours. Revisions to the Y-BOCS clinical version now reflect this conceptualization and incorporate avoidance into the compulsions checklist (Y-BOCS-II; Goodman et al., 2006).

In the current study, both time series data and standardized assessments indicated decreases in OCB from pre- to post-treatment. It is notable, however, that the SCAS and the RBS-R showed decreases across all subscales. For instance, the stereotypy and self-injury subscales of the RBS-R showed decreases even though these behaviours were purposely excluded from treatment. Potentially, decreases in OCB resulted in decreases in other areas of anxiety and repetitive behaviour (a non-specific treatment effect). Another possibility is that decreases in OCB had an effect on parent's ratings of the severity of other behaviours; improvements in OCB may have lead to under-rating the interference of other anxiety and repetitive behaviour. Future research is needed with additional participants to see if this pattern continues to emerge.

Some differences in changes between pre- to post-treatment were evident when comparing the CY-BOCS and time series data. Jackson, who showed the greatest percentage decrease on the CY-BOCS (34%), only showed response to treatment for one behaviour according to his time series data. For Abigail, eight treated behaviours appeared at acceptable levels at post-treatment according to the time series data, yet she showed no change on the compulsions scale of the CY-BOCS. This might be because on the CY-BOCS, participants rate only the top four most severe behaviours in the past week. At post-treatment, participants might not be rating the severity of the same four behaviours as in pre-treatment, which may have been the behaviours targeted for treatment. As behaviours show change during treatment, other

behaviours may be perceived as more important or more severe. Also, given our broad definition and number of behaviours that were endorsed (ranging between 9 and 18 compulsions), it might not have been realistic to expect a large change on the CY-BOCS given only nine weeks of treatment. To make sense of this discrepancy, future phases of an RCT evaluating this treatment protocol, involves parents rating on the severity and interference of same four compulsions at post-treatment as in pre-treatment.

Factors Influencing Outcomes of Treatment

Treatment effects were seen across all participants; however, there may have been a number of factors that influenced differential response to treatment. First, parental involvement was likely a moderator on the effect of treatment. Time series data indicated Abigail showed the greatest response to treatment. Her mother always returned data on time and showed consistency in completing home exposures (i.e., child homework sheets were filled out). In contrast, Jackson's mother showed poor compliance in returning data sheets on time and probe data was never collected. She had a number of other stressors which may have lead to poorer compliance, including two other siblings with ASD and a new job. Parent behaviours appear to have a large influence on the child's response to treatment. This indicates the importance of the intensive parent training components. During treatment sessions, parents were taught how to use the treatment components in the home, and given rationale for doing so. Parents role-played and brainstormed with each other on how to tackle OCBs for behaviors with functions other than anxiety. Parents who were better able to implement these techniques may have had children with a larger response to treatment. Potentially, this is why parents with younger children were also more satisfied with the treatment, because younger children were observed to be more willing to receive facilitation during exposures. Future research can address this using increased treatment

integrity measures in the home setting in order to determine what parental factors, and how parent training plays a role in response to treatment.

Second, challenges in discerning differential diagnoses may have impacted response to treatment. For Jackson, it wasn't clear until after assessment that some of his play behaviours may have been related to other diagnoses, such as social phobia. In assessment, behaviours appeared as "just right" compulsions, but during treatment, Jackson described a fear of losing, and social evaluation. He also reported a number of issues in peer socialization including bullying, and fears surrounding social interaction. An alternative treatment that focused on these issues may have proved more beneficial to Jackson. Jackson did show decreases in one behaviour, sleeping with books in his bed, which was more characteristic of OCB; the obsessions were about having nightmares.

Finally, it appeared that for selected participants, from pre- to post-test, independent assessors noted changes in their ability to articulate obsessions and compulsions. It is possible that treatment may have aided in providing children with a "language" to articulate their thoughts more clearly. For instance, Abigail was able to complete the obsessions component of the CY-BOCS at post-test. For Mason, although his compulsions decreased substantially, a number of new obsessions were revealed at post-test. Reaven et al. (2009) suggested an increase in self-awareness may have influenced increases in symptoms on child-reported measures of anxiety in their study of treatment involving children with HFA. It is also possible that treatment increased the child's comfort level in discussing their OCBs Further research needs to explore whether exposure to CBT translates to more awareness and vocalization of covert behaviors outside of treatment.

Limitations

This research has several limitations. First, results obtained in this study have limited generalizability as the study consisted of only four participants, and did not include an extended follow-up. This study was part of an ongoing RCT which assesses the efficacy of this function-based CBT protocol in a group format of three to four parent-child dyads. Also, researchers were unable to tease apart the different components of treatment to determine if it was the FBI, traditional CBT component(s), enhancements (see Table 2) or the combination which led to decreases in the children's OCBs. We did find significant change when ERP + CBT skills training + FBA/I was introduced, which is when active parent involvement was introduced. It is not known, however, whether AT added to the treatment, or if the changes would have occurred without it. Component analyses are needed to determine which aspects of treatment are necessary in demonstrating the decreases in OCBs found in this study.

One participant's data was not evaluated using a multiple baseline design, and several behaviours were evaluated using ABC designs. In the future, stronger single-case experimental designs should continue to be used, such as the multiple baseline designs used for three participants, in order to demonstrate efficacy of this treatment package. Future research should also investigate possible time-series designs to manage a large number of behaviours and participants.

Given that the CY-BOCS was not developed for use with children with HFA, it is difficult to separate ASD from OCD. For this reason, we represented our target behaviors with the term OCB. Necessary modifications to the instrument made cut-offs on the CY-BOCS invalid. There is also little consensus, and no criteria, for what constitutes response to treatment or remission for this population using this measure. Storch et al. (2010) found a 25% decrease on

the CY-BOCS predicted treatment response on the Clinical Global Impression-Improvement scale for typically developing children. It is unknown what percentage decrease on this scale would constitute response to treatment in children with HFA.

For three of the participants, it is difficult to determine whether treatment integrity was maintained at home. Parent checklists of treatment homework were reviewed and sent home, but we are unsure if they were clearly understood by parents. When parents left checkboxes blank, we could not interpret if that item was not applicable for that week or if they actually did not perform the treatment component. Completing integrity sheets may have been neglected as response effort for families was high; parents were facilitating exposure for their child, performing FBIs, completing parent report forms, and for some families, collecting probe data. Additionally, integrity based on probes captured only a portion of the treatment components. For example, probes would have captured extinction, but might not have captured differential reinforcement as parents delivered reinforcers closely following the exposure, but not immediately after (e.g. for Abigail's bedtime routine reinforcers were to be delivered in the morning). For the components that we could observe, parent integrity was high.

It can also be difficult to assess and treat OCBs given the number of different terms. OCB can be described as OCD, ritualistic behavior, repetitive behavior, AOCP, or compulsive behavior. A common language is needed in order to find and evaluate treatments for OCB, as well as assess these behaviours accurately.

Implications

The current study represents an initial stage in developing an empirically validated treatment for OCB in children with HFA. This research is the first phase of the first randomized controlled trial to investigate the use of FB-GCBT as a treatment for OCB in children with HFA,

and completion of this study represents data for the first four participants in the randomized controlled trial. This research may stimulate independent evaluations required to evaluate the efficacy of the *I Believe in Me, Not OCB* (Vause et al., 2010a) treatment protocol. Additionally, this research is the first CBT study that incorporates the RBS-R for assessing the nature and frequency of repetitive behaviours and, given the difficulty in assessing OCD in children with HFA, future research on OCD in children with HFA should continue to consider repetitive behaviours.

Conclusion

Positive results were obtained in this study using the *I Believe in Me, Not OCB* (Vause et al., 2010a) function-based CBT protocol to treat OCB in four school-aged children with HFA. Overall, parents indicated a reduction in OCB symptoms and greater quality of life at post treatment. While this data is promising, it is preliminary and the RCT will continue to evaluate the effects of the treatment protocol with a larger population of children with HFA and OCB. Given the number of children with HFA experiencing symptoms of OCB, it is important that evidence based treatments are developed for widespread use.

References

Albano, & Silverman, W. (1996). *Anxiety Disorders Interview Schedule for DSM-IV: Parent version.* San Antonio, Texas: Graywing.

American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC.

Asbahr, F. R., Catillo, A. R., Ito, L. M., Latorre, M., Moreira, M. N., & Lotufo-Neto, F. L. (2005). Group cognitive-behavioural therapy versus sertraline for the treatment of children and adolescents with obsessive-compulsive disorder. *Journal of the American Academy of Child and Adolescent Psychiatry, 44,* 1128-1136.

Attwood, T. (2004). *Exploring feelings: Cognitive behaviour therapy to manage anxiety.* Arlington, TX: Future Horizons.

Baron-Cohen, S., Ring, H. A., Wheelright, S., Bullmore, E. T., Brammer, M. J., Simmons, A., & Williams, S. C. (1999). Social intelligence in the normal and autistic brain: An fMRI study. *European Journal of Neuroscience, 11,* 1891-1898.

Barrett, P. M., Dadds, M. R., & Rapee, R. M. (1996). Family treatment of childhood anxiety: A controlled trial. *Journal of Consulting and Clinical Psychology* 64:333–342.

Barrett, P. M., Farrell, L., Pina, A. A., Peris, T. S., & Piacentini, J. (2008). Evidence-based psychosocial treatments for child and adolescent obsessive-compulsive disorder. *Journal of Clinical Child and Adolescent Psychology, 37,* 131-155.

Barrett, P., Healy-Farrell, L., & March, J. (2004). Cognitive-behavioral family treatment of childhood obsessive-compulsive disorder: a controlled trial. *Journal of the American Academy of Child & Adolescent Psychiatry, 43,* 46-62.

Bodfish, J. W., Symons, F. J., & Lewis, M. H. (1999). *The Repetitive Behavior Scale: Test manual.* Morganton: Western Carolina Center Research Reports.

Bolton, D., & Perrin, S. (2008). Evaluation of exposure with response-prevention for obsessive compulsive disorder in childhood and adolescence. *Journal of Behavior Therapy and Experimental Psychiatry, 39,* 11-22.

Brenton, A. V., Tonge, B. J., & Einfeld, S. L. (2006). Psychopathology in children and adolescents with autism compared to young people with intellectual disability. *Journal of Autism and Developmental Disorders, 36*, 863-870

Carr, E. G., Horner, R. H., Turnbull, A. P., Marquis, J. G., McLaughlin, D., M., McAtee, M. L., ...Braddock, D. (1999). *Positive behavior support for people with developmental disabilities: A research synthesis.* Washington, DC: AAMR.

Centers for Disease Control and Prevention (CDC) (2009). Prevalence of Autism Spectrum Disorders—Autism and Developmental Disabilities Monitoring Network, United States. MMWR Surveillance Summaries, 58 (SS10), 1-20

Chalfant, A., Rapee, R., & Carroll, L. (2006). Treating anxiety disorders in children with high-functioning autism spectrum disorders: A controlled trial. *Journal of Autism and Developmental Disorders, 37,* 1842-1857.

Chambless, D.L., & Hollon, S. D. (1998). Defining empirically supported therapies. *Journal of Consulting and Clinical Psychology*, *66*(1), 7–18.

Constantino, J. N., & Todd, R. D., (2003) Autistic traits in the general population: A twin study. *Archives of General Psychiatry,* 60, 524-530.

Constantino, J.N. & Gruber, C.P. (2005). *The social responsiveness scale*. Los Angeles: Western Psychological Services.

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied Behavior Analysis* (2nd ed.). New Jersey, NY: Pearson Education Inc.

de Bruin, E. I., Ferdinand, R.F., Meester, S., Nijs, P. F. A., & Verheij, F. (2007). High rates of psychiatric co-morbidity in PDD-NOS. *Journal of Autism and Developmental Disorders, 37,* 877-886.

Essau, C. A., Muris, P., and Ederer, E. E. (2002). Reliability and validity of the Spence Children's Anxiety Scale and the Screen for Child Anxiety Related Emotional Disorders in German children. *Journal of Behavior Therapy and Experimental Psychiatry, 33*, 1–18.

Feldman, M., Condillac, R., Tough, S., Hunt, S., & Griffiths, D. (2002). Effectiveness of community positive behavioral intervention for persons with developmental disabilities and severe behavior disorders. *Behavior Therapy, 33*, 377-398.

Fischer, D. J., Himle, J. A., & Hanna, G. L. (1998). Group behavioural therapy for adolescents with obsessive-compulsive disorder: Preliminary outcomes. *Research on Social Work Practice, 8*, 629-636.

Fischer-Terworth, C., & Probst, P. (2009). Obsessive-compulsive phenomena and symptoms in Asperger's disorder and High-functioning Autism: An evaluative literature review. *Life Span and Disability, 7*, 5-27.

Fombonne, E., Zakarian, R., Bennett, A., Meng, L., & McLean-Heywood, D. (2006). Pervasive developmental disorders in Montreal, Quebec, Canada: prevalence and links with immunizations. Pediatrics, 118(1), 139-150.

Freeman, J., Garcia, A., Coyne, L., Ale, C., Przeworski, A., Himle, M., ...Leonard, H.L. (2008). Early childhood OCD: Preliminary findings from a family-based cognitive-behavioral

approach. *Journal of the American Academy of Child & Adolescent Psychiatry, 47*, 593-602.

Freeman, J.B., & Garcia, A.M. (2009). *Family-Based Treatment for Young Children with OCD.* New York, NY: Oxford University Press.

Gadow, K., Devincent, C., Pomeroy, J., & Azizian, A. (2005). Comparison of DSM-IV symptoms in elementary school-age children with PDD versus clinic and community samples. *Autism, 9*(4), 392-415.

Ghaziuddin, M., Tsai, L., & Ghaziuddin, N. (1992). Comorbidity of autistic disorder in children and adolescents. *European Child and Adolescent Psychiatry, 1*(4), 209-213.

Gillott, A., Furniss, F., & Walter, A. (2001). Anxiety in high-functioning children with autism. *Autism, 5*(3), 277.

Goodman, W. K., Price, L. H., Rasmussen, S. A., Riddle, M. A. & Rapoport, J. L. (1986). *Children's Yale-Brown Obsessive Compulsive Scale (CY-BOCS).* National Institutes of Mental Health (public domain).

Goodman, W.K, Rasmussen, S.A., Price, L.H., & Storch, E.A. (2006). *Yale–Brown Obsessive-Compulsive Scale—Second Edition.* Unpublished manuscript.

Guy, W. (1976). Clinical Global Impressions. In *ECDEU Assessment Manual for Psychopharmacology, revised (DHEW Publ No ADM 76-338),*(pp. 218–222). Rockville, MD: National Institute of Mental Health.

Himle, J. A., Fischer, D. J., Van Etten, M. L., Janeck, A. S., & Hanna, G. L. (2003). Group behavioral therapy for adolescents with tic-related and non tic-related obsessive-compulsive disorder. *Depression and Anxiety, 17,* 73-77.

Hollander, E., Wang, A. T., Braun, A., & Marsh, L. (2009). Neurological considerations: Autism and Parkinson's disease. *Psychiatry Research, 170*, 43-51

Howlin, P. (1998). Psychological and educational treatments for autism. *The Journal of Child Psychology and Psychiatry and Allied Disciplines, 39*, 307-322.

Iwata, B.A., Dorsey, M.F., Slifer, K.J., Bauman, K.E., & Richman, G.S. (1994). Toward a functional analysis of self-injury. *Journal of Applied Behaviour Analysis, 27(2),* 197-209.

Kim, J., Szatmari, P., Bryson, S., Streiner, D., & Wilson, F. (2000). The prevalence of anxiety and mood problems among children with autism and Asperger syndrome. *Autism, 4*, 117.

Knox, L. S., Albano, A. M., & Barlow, D. H., (1996). Parental involvement in the treatment of childhood obsessive compulsive disorder: A multiple baseline examination incorporating parents. *Behavior Therapy, 27,* 93-115.

Lam, K. S. L., Aman, M. G. (2007). The Repetitive Behavior Scale – Revised: Independent validation in individuals with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 37,* 855–866.

Le Couteur, A., Rutter, M., Lord, C., Rios, P., Robertson, S., Holdgrafer, M., & McLennan, J. (1989). Autism diagnostic interview: A standardized investigator-based instrument. *Journal of Autism Developmental and Disorders, 19,* 363–387.

Lehmkuhl, H., Storch, E., Bodfish, J., & Geffken, G. (2008). Brief report: Exposure and response prevention for obsessive compulsive disorder in a 12-year-old with autism. *Journal of Autism and Developmental Disorders, 38*, 977-981.

Leyfer, O., Folstein, S., Bacalman, S., Davis, N., Dinh, E., Morgan, J., ... Lainhart, J.E. (2006). Comorbid psychiatric disorders in children with autism: interview development and rates of disorders. *Journal of Autism and Developmental Disorders, 36*(7), 849-861.

Lord, C., Rutter, M., & Couteur, A.L. (1994). Autism Diagnostic Interview-Revised: A revised version of the diagnostic interview for caregivers of individuals with possible pervasive developmental disorders. *Journal of Autism and Developmental Disorders, 24*, 659- 685.

Lord, C., Rutter, M., DiLavore, P.C., & Risi, S. (1999). *Autism Diagnostic Observation Schedule.* Los Angeles, CA: Western Psychological Services:

March, J. S., & Mulle, K. (1998). *OCD in Children and Adolescents: A Cognitive-Behavioral Treatment Manual.* New York, NY: The Guilford Press.

March, J.S., Frances, A., Carpenter, D., & Kahn, D. (1997). Treatment of obsessive compulsive disorder: The Expert Consensus Panel for obsessive compulsive disorder. *Journal of Clinical Psychiatry, 58* (suppl), 1–72.

Martin, J. L., & Thienemann, M. (2005). Group cognitive-behavior therapy with family involvement for middle-school-age children with obsessive-compulsive disorder: A pilot study. *Child psychiatry and human development, 36*, 113-127.

Matson, J. L, & Vollmer, T. R. (1995). *User's Guide: Questions About Behavioral Function (QABF).* Baton Rouge, LA: Scientific Publishers, Inc.

McCambridge, S. (2009). *Using function-based CBT with parent involvement to treat OCD in two school-age children with high-functioning autism* (Unpublished master's thesis). Brock University, St. Catharines, ON.

McGuire, J.F., Storch, E.A., Lewin, A.B., Price, L.H., Rasmussen, S.A., & Goodman, W.K. (2011). The role of avoidance in the phenomenology of obsessive-compulsive disorder. *Comprehensive Psychiatry.* doi:10.1016/j.comppsych.2011.03.002

McLean, P.D., Whittal, M.L., Thordarson, D.S., Taylor, S., Sochting, I., Koch, W. J,...Anderson, K.W. (2001). Cognitive versus behavior therapy in the group treatment of obsessive-compulsive disorder. *Journal of Consulting and Clinical Psychology, 69(2),* 205-214.

Milterni, R., Bravaccio, C., Falco, C., Fico, C, & Palermo, M.T. (2002). Repetitive behaviours in autistic disorder. *European Child and Adolescent Psychiatry, 11,* 210-218.

Mirenda, P., Smith, I.M., Vaillancourt, T., Georgiades, S., Duku, E., Szatmari, P., ... Zwaigenbaum, L. (2010). Validating the Repetitive Behavior Scale- Revised in young children with autism spectrum disorder. *Journal of Autism and Developmental Disorders,* Advance online publication. doi: 10.1007/s10803-010-1012-0

Muris, P., Steerneman, P., Merkelbach, H., Holdrient, L., & Meester, C. (1998). Co-morbid anxiety disorders symptoms in children with pervasive developmental disorders. *Journal of Anxiety Disorders, 12,* 387-393.

Nauta, M. H., Scholing, A., Rapee, R. M., Abbott, M., Spence, S. H., & Waters, A. (2004). A parent-report measure of children's anxiety: Psychometric properties and comparison with child-report in a clinical and normal sample. *Behaviour Research and Therapy, 42* 813-839.

Ooi, Y.P., Lam, C.M., Sung, M., Tan, W.T.S., Goh, T.J., Fung, D.S.S, ... Chua, A. (2008). Effects of cognitive-behavioural therapy on axiety for children with high-functioning autistic spectrum disorders. *Singapore Medical Journal, 49,* 215-220.

Pediatric OCD Treatment Study Team. (2004). Cognitive behavior therapy, sertraline, and their combination for children and adolescents with obsessive-compulsive disorder. *Journal of the American Medical Assosication, 292,* 1969-1976.

Piacentini, J., Langley, A., & Roblek, T. (2007). Cognitive-behavioral treatment of childhood OCD: It's a false alarm. New York: Oxford University Press.

Piacentini, J., Peris, T.S., Bergman, R.L., Chang, S., & Jaffer, M. (2007). Functional impairment in childhood OCD: Development and psychometrics properties of the child obsessive-compulsive impact scale-revised (COIS-R). *Journal of Clinical Child and Adolescent Psychology, 36,* 645–653.

Reaven, J. A., & Hepburn, S. (2003). Cognitive-behavioral treatment of obsessive-compulsive disorder in a child with Asperger syndrome: A case report. *Autism, 7*, 145.

Reaven, J. A., Blakeley-Smith, A., Nichols, S., Dasari, M., Flanigan, E., & Hepburn, S. (2009). Cognitive-Behavioral group treatment for anxiety symptoms in children with high-functioning autism spectrum disorders: A pilot study. *Focus on Autism and Other Developmental Disabilities, 24*, 27-37.

Rombough, L. (2011) *Dyad Function-Based Cognitive Behavioural Therapy as a Treatment for Obsessive Compulsive Disorder in Two School Aged Children with High Functioning Autism* (Unpublished master's thesis). Brock University, St. Catharines, ON

Rumsey, J. M., Rapoport, J. L., & Sceery, W. R. (1985). Autistic children as adults: Psychiatric, social, and behavioral outcomes. *Journal of American Academy of Child Psychiatry, 24,* 465–473.

Ruta, L., Mugno, D., D'Arrigo, V.G., Vitiello, B., & Mazzone, L. (2010). Obsessive-Compulsive tratits in children and adolescents with Asperger syndrome. European *Child & Adolescent Psychiatry, 19*, 17-24.

Scahill, L., Riddle, M. A., McSwiggin-Hardin, M., Ort, S. I., King, R. A., Goodman, W. K., ...Leckman, J.F. (1997). Children's Yale-Brown obsessive–compulsive scale: Reliability

and validity. *Journal of the American Academy of Child and Adolescent Psychiatry, 36,* 844–852.

Singh, N.N., Matson, J.L., Lancioni, G.E., Singh, A.N., Adkins, A.D., McKeegan, G.F., & Brown, S.W. (2006). Questions About Behavioral Function in Mental Illness (QABF-MI): A behavior checklist for functional assessment of maladaptive behavior exhibited by individuals with mental illness. *Behavior Modification, 30*, 739-751.

Sofronoff, K., Attwood, T., & Hinton, S. (2005). A randomised controlled trial of a CBT intervention for anxiety in children with Asperger syndrome. *Journal of Child psychology and Psychiatry, 46*(11), 1152-1160.

Sparrow, S.S., Cicchetti, D.V., & Balla, D.A. (2005). *Vineland Adaptive Behavior Scales, Second Edition* (Vineland-II). Circle Pines, MN: AGS Publishing.

Spence, S. H., Barrett, P. M., & Turner, C. M. (2003). Psychometric properties of the Spence children's anxiety scale with young adolescents. *Journal of Anxiety Disorders, 17*, 605-625.

Steketee, G. (1993). *Treatment of obsessive-compulsive disorder*. New York: Guilford.

Storch, E. A., Murphy, T. K., Geffken, G. R., Soto, O., Sajid, M., Allen, P., ... Goodman, W.K. (2004). Psychometric evaluation of the children's Yale-Brown obsessive–compulsive scale. *Psychiatry Research, 129*, 91–98.

Sze, K., & Wood, J. (2007). Cognitive behavioral treatment of comorbid anxiety disorders and social difficulties in children with high-functioning autism: A case report. *Journal of Contemporary Psychotherapy, 37*, 133-143.

Tantam, D. (2000). Psychological disorder in adolescents and adults with Asperger syndrome. *Autism, 4*(1), 47.

Thienemann, M., Martin, J., Cregger, B., Thompson, H.B., & Dyer-Friedman, J. (2001), Manual-driven group cognitive-behavioral therapy for adolescents with obsessive-compulsive disorder: a pilot study. *Journal of the American Academy of Child and Adolescent Psychiatry, 40*, 1254–1260.

Thompson, B. (2008). *Foundations of behavioural statistics: An insight-based approach.* New York, NY: The Guilford Press.

Vause, T., Neil, N., & Feldman, M. (2010a). *I Believe in Me not OCB.* Unpublished manuscript.

Vause, T., Neil, N., & Feldman, M. (2010b). *I Believe in Me not OCB: Workbook.* Unpublished manuscript.

Vollmer, T.R., Marcus, B.A., & Ringdahl, J.E. (1995). Progressing from brief assessments to extended functional analyses in the evaluation of aberrant behaviour. *Journal of Applied Behaviour Analysis, 28,* 561-576.

Watson, H., & Rees, C. (2008). Meta-analysis of randomized, controlled treatment trials for pediatric obsessive-compulsive disorder. *Focus, 49*, 489-498.

Wechsler, D. (2004). *Wechsler Intelligence Scale for Children – Fourth Edition* (WISC-IV). San Antonio: TX: The Psychological Corporation.

Wood, J. J., Piacentini, J. C., Southam-Gerow, M., Chu, B. C., & Sigman, M. (2006). Family cognitive behavioral therapy for child anxiety disorders. *Journal of the American Academy of Child & Adolescent Psychiatry, 45*, 314–321

Wood, J., & McLeod, B. (2008). *Child anxiety disorders: A treatment manual for practitioners.* New York: Norton.

Wood, J., Drahota, A., Sze, K., Har, K., Chiu, A., & Langer, D. (2009). Cognitive behavioral therapy for anxiety in children with autism spectrum disorders: a randomized, controlled trial. *Journal of Child Psychology and Psychiatry, 50*, 224–234.

Appendix A

Clinical Responding Test

Brief Test of Verbal Fluency

*At the start of individual testing, go through the following verbal fluency questions. If the child appears uncomfortable or distracted, attempt to engage the child in his/her topic of interest and then come back to these questions. Feel free to embed topics of interest as you ask these questions. Please mark a "yes" or a "no" next to whether the child can answer the question. This will be taped, so we can go back and get more detail at a later point.

1. Use picture that Nicole has provided. Ask two or three receptive questions. For example, "point to X" or "show me X." Keep simple.
2. With picture in front of child, ask the child to describe the picture to you.
3. Describe your family to me.
4. What are some of your favourite things to do?
5. What kinds of things make you happy?
6. What kinds of things make you sad?
7. Do you like to spend time with friends? If yes, ask: what do you like to do together?
8. What do you want to be when you grow up? Why?

General comments on participants responses:

_____

_____

_____

_____

_____

Appendix B

List and Description of Treated OCBS

List and Description of Abigail's Treated OCBs

OCB	Obsession	Compulsion
Sitting in the same spot (Booster Seat, Dinner Seat, Downstairs Seat)	Unknown	Had to sit in the same spot in the car (i.e. in the booster seat behind the passenger seat in the car), at dinner table, and on the couch in the basement (i.e. left most seat on the couch).
Telling on sister and dad	Unknown	Told mother about minor transgressions or jokes performed by sister and father frequently throughout the day
Avoiding confession/sorry	Unknown	Avoiding saying the words confession or sorry. Crying or yelling when hearing the word confession.
Pulling at clothes until perfect/feel good	Unknown	Adjusting all clothing repeatedly while getting dressed and throughout the day. Avoiding wearing articles of clothing because they were "picky."
Morning Routine	Unknown	Having to arrange hair things before starting to do hair e.g. spray, elastics
Bedtime routine	Unknown	Having to read a story, mom must kiss/hug in certain way, must holding stuffed lamb and dolphin in hands, has boogie blanket, has to have a blanket over ear
Collecting things/difficulty throwing things away	Worried about throwing things away because may need them in the future	Bringing home seemingly useless objects (e.g. rocks and string) and an inability to discard worn-out or seemingly useless objects

List and Description of Jackson's Treated OCBs

OCB	Obsession	Compulsion
Checking things to make sure they are safe	Thinking about things being where they are supposed to be	Looking at constructed LEGO pieces frequently throughout the day
Have to sleep with books in bed	Fear of having nightmares	Had to have a number of books (5-10) in bed every night or would have difficulty falling asleep
Avoiding competition by running away	Fear of making mistakes or losing	Refusing to participate in competitive games (e.g. soccer, tag) by saying no to offers, or walking away from games
Counting specks of dust, counting	Unknown	Pulling the elastics from socks and counting the specks of dusts that are created

elastics, counting other things		
Must be in control	Fear of making mistakes or losing	Creating or altering the rules of games in order to win
Getting very upset when things go wrong	Unknown	Refusal to participate in activities that were not scheduled or not performed on time

List and Description of Mason's Treated OCBs

OCB	Obsession	Compulsion
Morning Routine	Could forget something important, makes him feel ready, makes him feel better, keeps him organized. Everything has to feel just right	Having to wake up at 6:00am. Having to play on the computer in the basement for one hour before getting ready for school and after coming home from school. If he was unable to have a full hour, he would set his alarm earlier the next day to "make up" the time missed.
Reassurance about marks on body	Fear he might have hurt himself	Asking parents frequently throughout the day for reassurance that marks on body (e.g. scars, discolorations of skin, and actual injuries) would not lead to infection or serious illness.
Saving useless items	Worries about throwing things away; Might need these things in the future	Having six drawers in bedroom filled with seemingly useless items (e.g. papers from other students at school). Filling pockets with seemingly useless items (e.g. rocks, buttons) to bring home.
Asking a parent to answer the same question over and over	Need to know	Asking parents frequently throughout the day about routine activities (e.g. where are we going?" "what time are we going")
Rubbing parents	Unknown	Frequently rubbing parents arms or heads throughout the day

List and Description of Peter's Treated OCBs

OCB	Obsession	Compulsion
Must sit in specific chairs (Dinner seat and TV seat)	Unknown	Had to sit in the same seat in the living room (e.g. the chair closest to the TV) and at the dinner table (i.e. at the head of the table)
Wet clothes	Unknown	Having to change items of clothing if they got wet, even for minor amounts of moisture.
Erasing and rewriting words	Unknown	Erasing and rewriting words frequently throughout writing tasks. Writing over a letter several times frequently throughout homework.
Reassurance at bed time	Unknown	Telling mother that he loved her and asking about her location frequently after being put to bed.

		Would continue to ask until questions were answered.
Bedtime routine	Unknown	Having to arrange pillow and stuffed animals in a particular place and order, roll up pant legs and sleeves of pyjamas, get under covers, arrange covers in a particular manner, and say prayers before falling asleep.
Arranging things	Unknown	Arranging a number of different items (e.g slippers; things on headboard; stuffed animals) in a specific order or lining them up in a straight line
Always has to go first	Worried someone might come behind him if he was last	Having to go first out the front door, into the car and while playing games. Not going first resulted in physical aggression to those who did go first.
Must get dressed in a specific way	Unknown	Having to put underwear on first, followed by socks, then pants, then shirt.

Appendix C

Parent Report

Parent Check-in Form					
Informant(first and last name):					
Date(mm/dd/yy):					
1. This morning, about how long did A take to complete her morning routine (pyjamas off, underwear, pants, look in mirror, shirt, socks, hair)?					
N/A☐	1☐	2☐	3☐	4☐	5☐
	10 minutes	11-13 minutes	14-16 minutes	17-19 minutes	20 or more minutes
2. This morning, how many times did you adjust A's socks?					
N/A☐	1☐	2☐	3☐	4☐	5☐
	0 times		1-2 times		3 or more times
3. This morning, how many times did A ask you to adjust her socks?					
N/A☐	1☐	2☐	3☐	4☐	5☐
	0 times		1-2 times		3 or more times
4. Before leaving the house, how many times did you adjust A's shoes?					
N/A☐	1☐	2☐	3☐	4☐	5☐
	0 times		1-2 times		3 or more times
5. Before leaving the house, how many times did A ask you to adjust her shoes?					
N/A☐	1☐	2☐	3☐	4☐	5☐
	0 times		1-2 times		3 or more times
6. How many seemingly useless items did A bring home today (e.g. acorns, wrappers, paper)?					
N/A☐	1☐	2☐	3☐	4☐	5☐
	0 times	1 item	2-3 items	4 items	5 or more items
7. How many times did A ask about hoarded items (e.g. if you have thrown something away, or where a collected item was?)					
N/A☐	1☐	2☐	3☐	4☐	5☐
	0 times	1 time	2-3 times	4 times	5 or more times

8. Did A have to complete her entire bedtime routine tonight (e.g. pyjamas, snack, sister to bed, read story, say prayers, hold her lamb and dolphin, and have blanket cover ears)?					
N/A☐	1☐	2☐	3☐	4☐	5☐
	Flexible in changing the order of at least three items in evening routine		Can change order of one item in evening routine		Yes she did
9. Did A continue to ask until you said; "e.g. yes, we are going to …" or were you able to just say yes?					
N/A☐	1☐	2☐	3☐	4☐	5☐
	Most words in sentence do not match question		Part of the sentence		Whole sentence
10. In general, how many times did A have to tell on her sister or dad?					
N/A☐	1☐	2☐	3☐	4☐	5☐
	0 times	1 time	2-3 times	4 times	5 or more times
11. At dinner, did A have to sit in the same spot today?					
N/A☐	1☐	2☐	3☐	4☐	5☐
	No, she didn't		Some of the time		Yes, the whole time
12. Downstairs, did A have to sit in the same spot on the couch today (far left seat)?					
N/A☐	1☐	2☐	3☐	4☐	5☐
	No, she didn't		Some of the time		Yes, the whole time
13. In the car, did A have the booster seat in the same position (booster seat behind passenger)?					
N/A☐	1☐	2☐	3☐	4☐	5☐
	No, she didn't		Some of the time		Yes, the whole time

14. When A had to apologize, how difficult was it for her?					
N/A☐	1☐	2☐	3☐	4☐	5☐
	Apologized with only one prompt and with more words than just sorry		Said sorry with only one prompt		Said sorry with more than one prompt
15. If A heard the word 'confession', was A able to tolerate it?					
N/A☐	1☐	2☐	3☐	4☐	5☐
	Was able to say the word confession		Tolerates someone else saying the word confession		No she didn't
16. Did A have to finish an entire TV show before continuing on to something else?					
N/A☐	1☐	2☐	3☐	4☐	5☐
	Was able to stop watching at any time		Was able to stop watching at commercial break		Yes, she did
Comments:					

Appendix D

Additional Questions Included in the Questions About Behavioural Function

6. Does the person seem to engage in the behaviour to get rid of uncomfortable thoughts/images/impulses					
12. Engage in the behaviour to reduce stress or prevent some dreaded situation from occurring (but the behaviour is not connected in a realistic way with that they are designed to neutralize					
18.Engages in the behaviour in response to a thought or according to a rule that must be applied rigidly					
24.Engages in the behaviour to cope with thoughts/images/impulses					
30. Does the child appear worried (i.e. facial expressions, body tightened) before engaging in the behaviour					

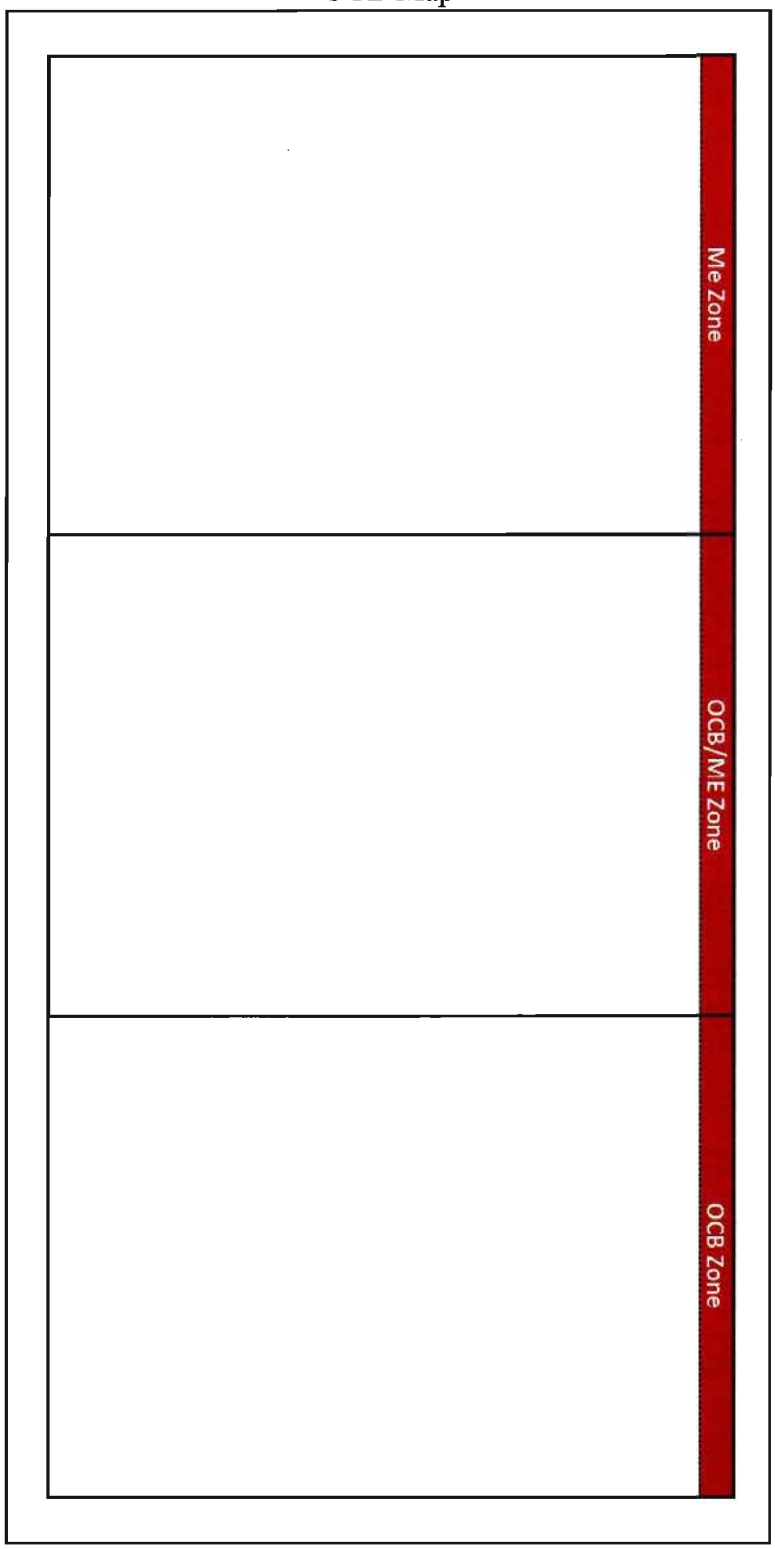
Appendix E

Examples of Likert Questions Used to Rate Probes

What percentage of this drawer is filled with clutter?					
N/A☐	1☐	2☐	3☐	4☐	5☐
Image quality too poor to tell	Typical levels of clutter		Somewhat full with clutter		Completely filled with clutter
Did A complete her hair routine (i.e. place two sprays and her brush on her bed before having her hair styled by her mother)?					
N/A☐	1☐	2☐	3☐	4☐	5☐
	No, she didn't		Placed only some of the items on her bed		Yes she did

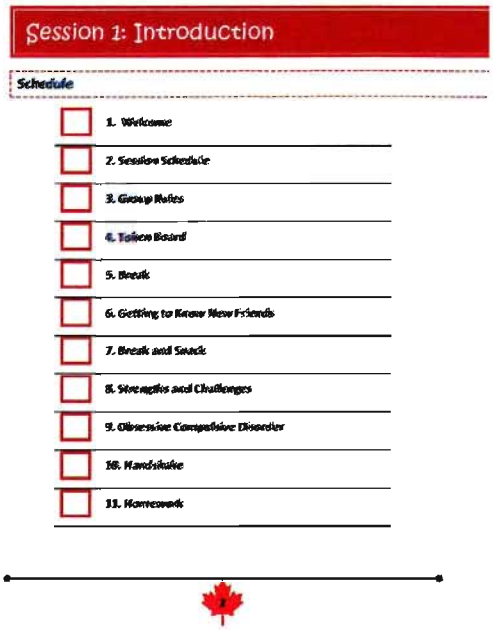
Appendix F

OCB Map



Appendix G

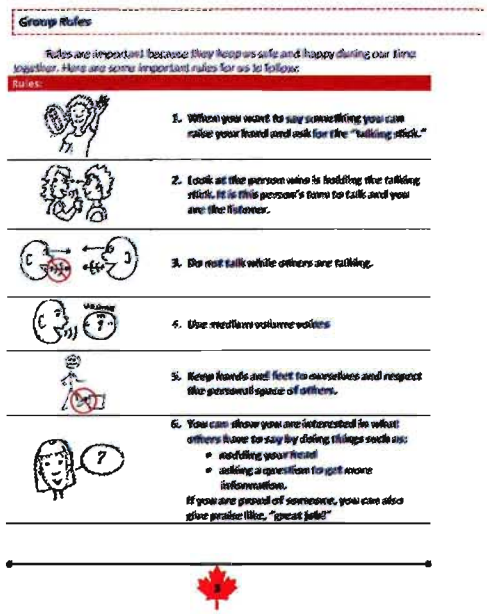
Sample Workbook Pages



Session 1: Introduction

Schedule

- 1. Welcome
- 2. Session Schedule
- 3. Group Rules
- 4. Token Board
- 5. Break
- 6. Getting to Know New Friends
- 7. Break and Snack
- 8. Strengths and Challenges
- 9. Obsessive Compulsive Disorder
- 10. Handshake
- 11. Homework



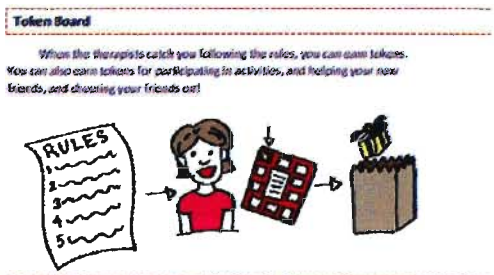
Group Rules

Rules are important because they keep us safe and happy during our time together. Here are some important rules for us to follow:

Rules:

1. When you want to say something you can raise your hand and ask for the "talking stick."
2. Look at the person who is holding the talking stick. It is this person's turn to talk and you are the listener.
3. Do not talk while others are talking.
4. Use medium volume voices
5. Keep hands and feet to ourselves and respect the personal space of others.
6. You can show you are interested in what others have to say by doing things such as:
   - nodding your head
   - asking a question to get more information.

If you are proud of someone, you can also give praise like, "great job!"



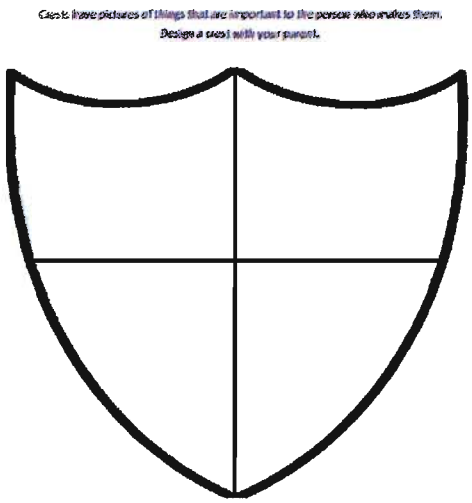
Token Board

When the therapists catch you following the rules, you can earn tokens. You can also earn tokens for participating in activities, and helping your new friends, and choosing your friends out!

Getting to Know New Friends - The Me Crest

Fill in the blanks below to help describe yourself to your new friends in group. Then design a crest to help show what is important to you.

My favourite colour is _____. In school, I like to _____ _____. I like to eat _____. When I'm at home I like to _____. Something that always makes me laugh is _____. A time when I was proud of myself was _____ _____ _____



Classic have pictures of things that are important to the person who makes them. Design a crest with your parent.

Meet your helpers:

Canada is a country famous for its wilderness, wild climate and, of course its wild animals! Four famous Canadian animals are going to help you throughout this workbook to believe in yourself and not OCD.

Guiding Goose | Review Racoon | Busy Beaver | Brave Bear

Wherever you see me, you will be learning or doing something new

Wherever you see me, you will be practising something old

Wherever you see me, you will be practising something at home

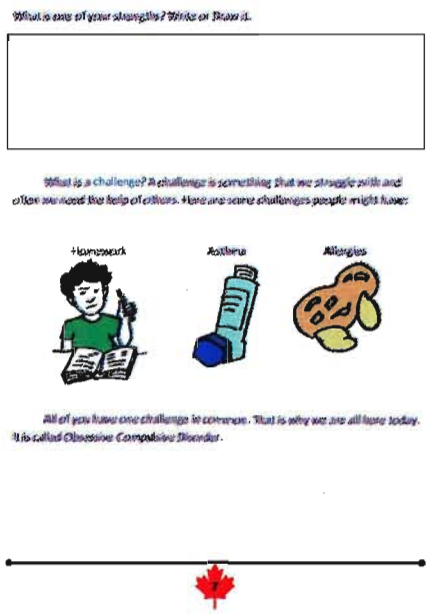
Wherever you see me, you will be learning to say no to OCD

What Makes Us Unique: Our Strengths and Challenges

Our minds and bodies all work differently. This is what makes us unique individuals! Each one of us has strengths and challenges.

What is a strength? A strength is something that you do well or that you are proud of. Here are some strengths people might have:

Playing a Sport | A Subject in School | A Musical Instrument



What is one of your strengths? Write or Draw it.

What is a challenge? A challenge is something that we struggle with and often we need the help of others. Here are some challenges people might have:

Homework | Asthma | Allergies

All of you have one challenge in common. That is why we are all here today. It is called Obsessive Compulsive Disorder.

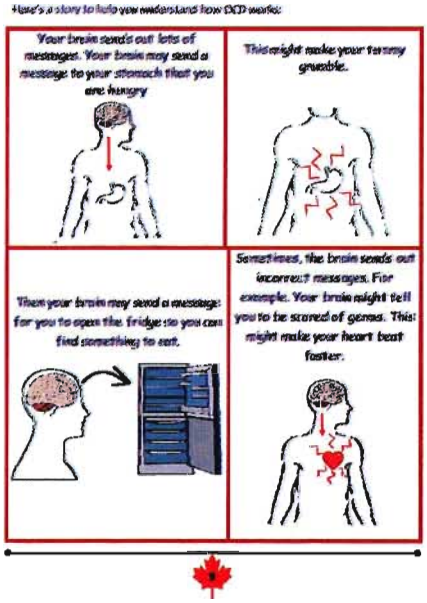
What is Obsessive Compulsive Disorder?

Sometimes your brain may send out wrong messages. This is called OCD. OCD is like Hiccups. It's not your fault at all. It just happens.

Hiccup

Sometimes we try lots of things to make hiccups go away but they just won't! Here are some things we often try:

Drinking water | Holding our breath | Standing on our heads



Here's a story to help you understand how OCD works:

Your brain sends out lots of messages. Your brain may send a message to your stomach that you are hungry

This might make your tummy grumble.

Then your brain may send a message for you to open the fridge so you can find something to eat.

Sometimes, the brain sends out incorrect messages. For example, Your brain might tell you to be scared of germs. This might make your heart beat faster.

Then your brain may send a message for you to take a shower in very hot water.

Having OCD does not mean that your brain is damaged. Lots of very smart people have OCD. OCD just means sometimes your brain sends out incorrect messages.

In this group, you will learn a bunch of new things that will help you to recognize the incorrect messages that OCD sends.

By believing in yourself and learning new strengths, you will learn how to tell OCD to go away. What are some other things that you can tell OCD to do?

Buzz Off! **Beat it!** **Go Away!**

Write your own: _____

10

Obsessions

OCD has two parts – the first part is called Obsessions. That's the O part. Obsession is another word for worries, pictures in your head, or feelings that you might have. Here are some examples:

Worrying that your hands are not clean

Worrying about getting sick

Having a feeling that something just isn't quite right

Worrying that something bad might happen to you or your family

11

What are some worries or unpleasant feelings that you have? Write them down or draw a picture of them

My Obsessions:		
Write here...		
1.		
2.		
3.		
Draw here...		

12

Appendix H

OCB FBA/Is

Abigails's OCB FBAs/Is

OCB	Identified QABF and FAI Functions	FBI
Sitting in the same spot – Booster Seat	Escape from anxiety, tangible (rule out), escape (rule out), nonsocial physical	DRL (Competing Reinforcer) Tangible/activity reinforcers contingent on reaching daily seat goals (average of sitting in the spot behind the passenger seat 25% of the time).
Sitting in the same spot – TV seat	Escape from anxiety, tangible, escape, non-social, physical	NCR+ DRL(Competing Reinforcer) Access to tangible (television)/escape (social situations) in all seats. Tangible/activity reinforcers contingent on reaching daily seat goals (average of sitting in the spot on far right seat of couch 20% of the time).
Needing to tell on sister and dad	Escape from anxiety, attention, tangible (rule out), escape, non-social, physical	DRA+ext Withheld attention ifAbigail told on sister or dad. Verbal praise contingent upon not telling on sister or dad or continuing in activities after sister or dad had performed activities typically associated with telling (e.g. making a joke, borrowing a toy). Tangible/activity reinforcers contingent on reaching daily frequency goals.
Sitting in the same spot – Dinner Table	Escape from anxiety, Attention(rule out), Tangible(rule out), escape(rule out), non-social physical,	DRL (Competing Reinforcer) Tangible/activity reinforcers contingent on reaching daily seat goals (average of sitting in the far left at the dinner table 25% of the time).
Avoiding talking about doing things wrong	Escape from anxiety, Attention, Escape, non-social (rule out), physical	DRA+ext Withheld attention and redirected her to social story if Abigail verbally protested when hearing the word 'confession' or 'sorry'. Verbal praise/tangibles contingent upon lack of verbal protests or saying the words 'confession' or 'sorry.'
Pulling at clothes until perfect/feel good	Escape from anxiety, attention, escape, non-social, physical	DRA +Ext Withheld attention if picking at clothing occurred. Verbal praise and tangible/activity reinforcers contingent upon not picking at clothing.

Bedtime routine	Escape from anxiety, Attention, Escape, nonsocial	DRA +Ext Withheld attention if bedtime ritual occurred. Verbal praise and tangible/activity reinforcers contingent upon changing bedtime ritual.
Collecting things Difficulty throwing things away	Escape from anxiety, Attention, Tangible, Escape, Non-social	DRA +Ext Withheld attention if Abigail brought seemingly useless items home or unable to throw away items. occurred. Verbal praise and tangible/activity reinforcers contingent upon not bringing home seemingly useless items or throwing away items.

Jackson's OCB FBAs/Is

OCB	Identified QABF and FAI Functions	FBI
Have to sleep with books in bed	Escape from anxiety, tangible (rule out), non-social	DRA (Competing Reinforcer) Tangible/activity reinforcers contingent on sleeping without books in bed.
Avoiding competitions by running away	Escape from anxiety, escape, non-social (rule out)	DRA+Ext Tangible/activity reinforcers contingent on participating in competitive games. Redirected back to competitive games if attempt to stop participating.
Counting specks of dust	Escape from anxiety, tangible (rule out), escape, non-social	DRA+Ext Tangible/activity reinforcers contingent on absence of counting specks of dust. If Jackson stopped an activity to engage in counting specks of dust, was redirected back to that activity.
Changing the rules of games	Escape from anxiety, tangible, escape	DRA + Ext Tangible/activity reinforcers if Jackson follows pre-set rules of games. Redirected back to playing with pre-set rules of game if Jackson attempts to alter the rules or leave the game.
Getting upset when things are not scheduled	Escape from anxiety, tangible , escape, non-social (rule out)	DRA + Ext Tangible/activity reinforcers if Jackson participates in unscheduled activities. Redirected back to unscheduled activities if Jackson attempts to leave or not participate in them.

Mason's OCB FBAs/Is

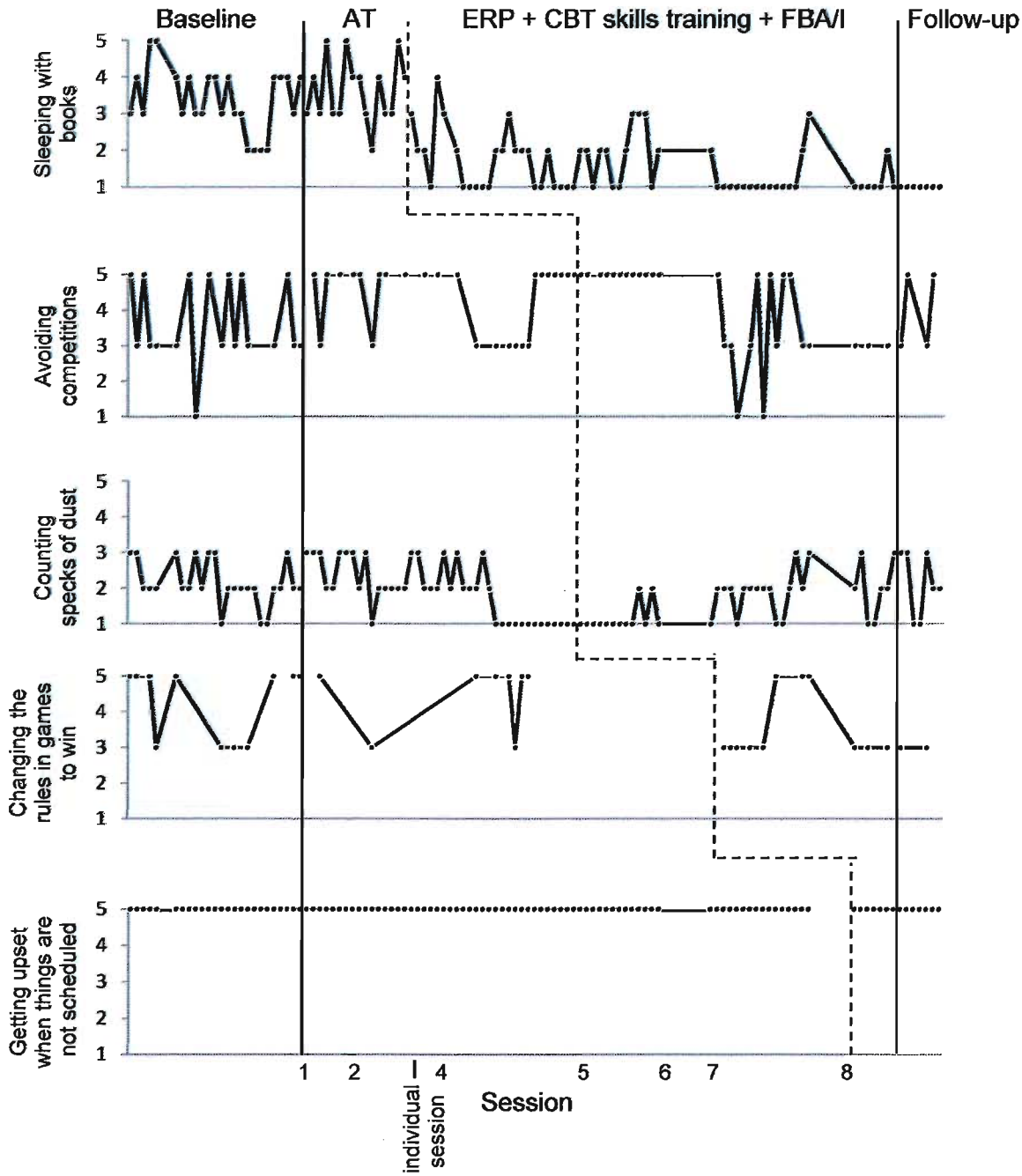
OCB	Identified QABF and FAI Functions	FBI
Morning and evening routines	Escape from anxiety, attention, tangible, escape, non-social	DRA+Ext Withheld attention ifMason performed morning or evening routines. Verbal praise/tangibles contingent showing flexibility in his routines.
Asking for reassurance about marks on body	Escape from anxiety, attention, tangible, escape, non-social	DRA+Ext Withheld attention whenMason asked for reassurance about marks on his body and redirected back to activities previously engaged in. Verbal praise/tangibles contingent on not asking about marks on his body. Withheld creams/bandages unless medically necessary.
Difficulty throwing things away and collecting and saving	Escape from anxiety, attention, tangible, escape, non-social	DRA+Ext Withheld attention for items brought home or when seen picking up items to bring home. Redirected to other activites when seen picking up items to bring home. Verbal praise/tangibles when M did not bring home items or did not pick up items to bring home.
Reassurance regarding routines	Escape from anxiety, attention, tangible, escape, non-social	DRA+Ext Withheld attention/tangibles whenMason asked for reassurance about routines. Verbal praise/tangibles contingent on not asking for reassurance about routines.
Need to rub parents hair or arms	Escape from anxiety, attention, tangible, escape, non-social	DRA+Ext Withheld attention/tangibles whenMason engaged in rubbing parents, and redirected to ask for attention or physical contact using a verbal statement (e.g. can I have a hug, or can you come look at this?). Verbal praise/physical contact when asked for attention or physical contact in an appropriate way.

Peters's OCB FBAs/Is

OCB	Identified QABF and FAI Functions	FBI
Sitting in the same spot – Dinner table	Escape from anxiety, attention, tangible (rule out), escape (rule out), non-social	DRL (Competing Reinforcer) Tangible/activity reinforcers contingent on reaching daily seat goals (average of sitting at the head of the table 25% of the time).
Sitting in the same spot - TV seat	Escape from anxiety, attention, tangible, non-social	DRL (Competing Reinforcer) Tangible/activity reinforcers contingent on reaching daily seat goals (average of sitting chair in front of the television 25% of the time).
Erasing and rewriting words	Escape from anxiety, attention, escape, non-social	DRA+Ext Withheld attention when erasing or rewriting words. Verbal praise/tangibles when M did not erase or rewrite words.
Seeking reassurance at bedtime	Escape from anxiety, attention, escape, non-social (rule out)	DRA+Ext Withheld attention when Peter asked for reassurance at bedtime. Verbal praise/tangibles in morning when M did not ask for reassurance at bedtime.
Bedtime routine	Escape from anxiety, attention, tangible, escape, non-social	DRA+Ext Withheld attention when Peter arranges animals or covers on bed. Verbal praise/tangibles in morning when Peter did not arrange covers or animals on bed.
Arranging things	Escape from anxiety, Escape (rule out), non-social	DRA+Ext Withheld attention when arranging toys on shelf. Verbal praise/tangibles when M did not arrange toys on shelf.
Always has to go first	Escape from anxiety, attention, tangible, non-social (rule out)	DRL Withheld attention when going first when not scheduled. Verbal praise/tangible reinforcer contingent on reaching daily going first goals (average of going first 25% of the time).

Appendix I

Multiple baseline across Jackson's treated OCBs using daily parent rated data



Appendix J

Sample Parent Homework Sheet

Reviewed Strategies from Stairs of Learning with Child(3 times/week) Reviewing consists of demonstrating the strategy to your child and having her demonstrate the strategy to you	1 ☐	2 ☐	3 ☐
Reviewed Parent Strategies(3 times/week) Reviewing consists of reading the strategies below **Booster Seat in the Car** • Practise homework every time A gets in the car • Continue to practise homework even if A is not well **TV seat** • Practise homework every time A watches TV • Continue to practise homework even if A is not well • Continue to provide A with her preferred TV shows and the same amount of social interaction when sitting in other seats **Telling on Sister and Dad** • Practise homework every time A tells on her sister or dad • If A tells, redirect her to her social story in a neutral voice then have her return to the activity she was doing before • Provide praise if A uses her techniques on her own, or if she does not tell on her sister or dad	1 ☐	2 ☐	3 ☐

Observed Child Practising Homework (one time)	Strategies Actually Used by Child:	Parent Strategies Actually Used:	
	Booster Seat in the Car		
		Practise homework every time A gets in the car	☐
		Continue to practise homework even if A is not well	☐
	TV seat		
		Practise homework every time A watches TV	☐
		Continue to practise homework even if A is not well	☐
		Continue to provide A with her preferred TV shows and the same amount of social interaction when sitting in other seats	☐
	Telling on Sister and Dad		
		Practise homework every time A tells on her sister or dad	☐
		If A tells, redirect her to her social story in a neutral voice then have her return to the activity she was doing before	☐
		Provide praise if A uses her techniques on her own, or if she does not tell on her sister or dad	☐